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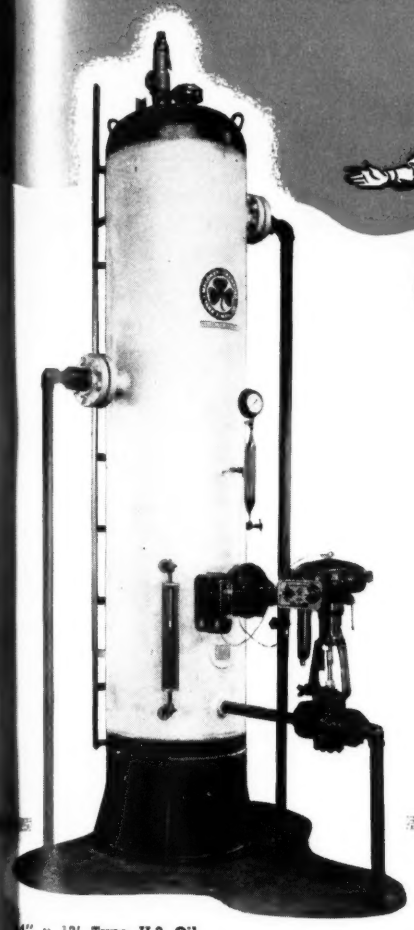

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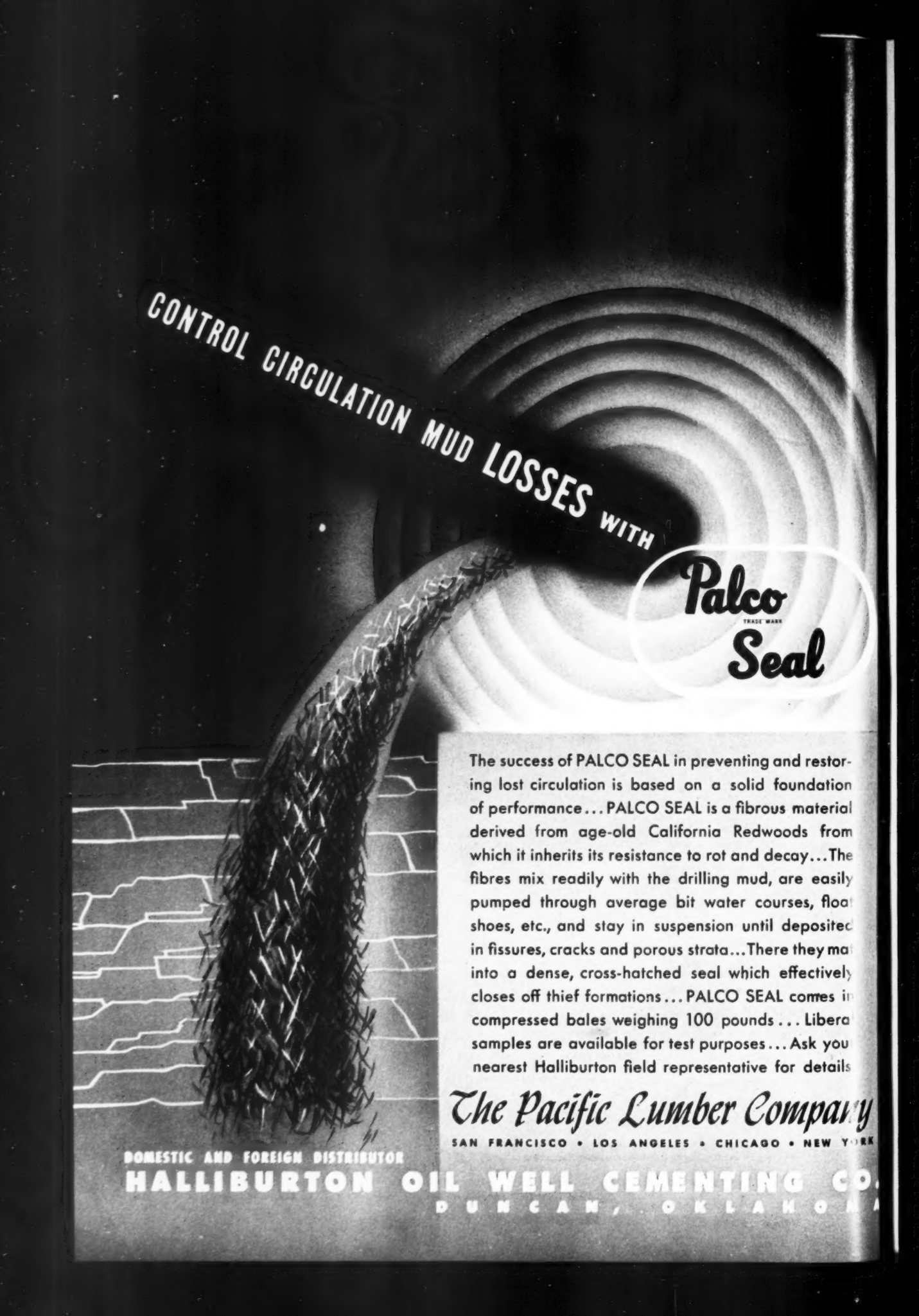
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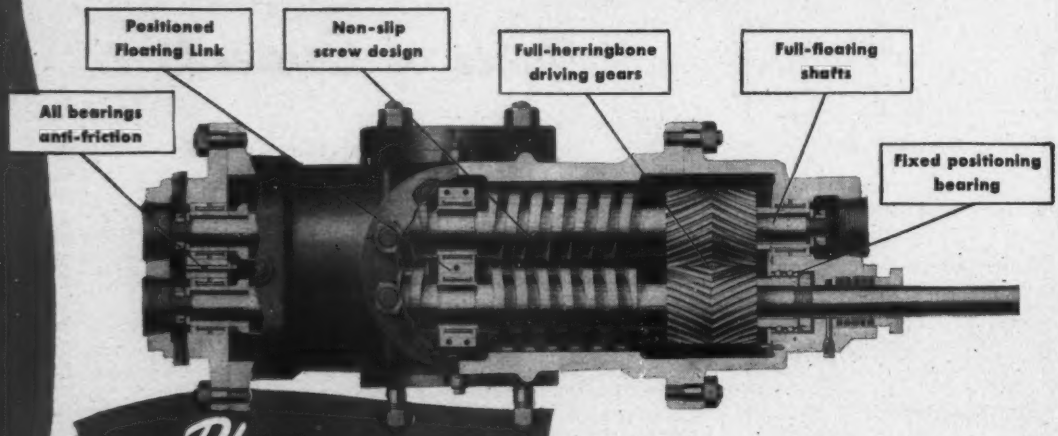

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An Oil-Rubber Policy

HEADS of rubber companies, the American Automobile Association, and others are demanding that the Government determine what its postwar rubber policy is to be. They see in the making developments which are certain to result in confusion and permanent harm to the manufacturers and users of rubber products and all allied activities.

Before the war this industry's participation in rubber centered in the fact that gasoline and rubber consumption parallel, and that oil-marketing companies had become large distributors of rubber products. Now petroleum occupies a key position in rubber supplies. It provides practically all of the butadiene used in the manufacture of synthetic rubber on which this country and the entire world has been largely dependent since 1942 when the Japanese gained control of natural-rubber.

The person who has forgotten the rubber emergency of the war period has also forgotten Pearl Harbor. Complete disaster to the Allied cause was averted because of the Herculean efforts of the petroleum and rubber industries which had the "know how" needed to establish a new major synthetic enterprise within a period of 2 years. Petroleum proved to be the cheapest method of producing the essential butadiene.

But natural rubber is becoming available again in rapidly increasing quantities. The long-heralded competition between natural and synthetic rubber is here. Both sources of supplies, so far as this country is concerned, are under government control because Reconstruction Finance Corp. is the sole buyer of natural rubber and the three-quarter-billion-dollar synthetic-rubber facilities are largely owned by the Government.

It has been stated that the oil business generally will not be affected by a return to the use of natural rubber because its direct participation in synthetic rubber is confined to a dozen plants operated under lease from the Government. It is true that the volume of liquids is small compared to total petroleum consumption, but it is nevertheless an important byproduct activity and the most significant development so far in petrochemical operations. Only a start has been made in determining what can be done with synthetic rubber as regards utilization.

The entire oil industry is concerned with rubber's part in the reestablishment of a sound national economy, including preparation for another possible emergency. Goodrich's John L. Collyer summarized this situation last week when he said, referring to synthetic rubber, "the important point for the American people to realize is that now is the time for Government to turn its attention to the project of making sure that our rubber insurance policy does not lapse—that in future years we shall not once more become a 'have not' nation with respect to rubber."

A.P.I. Board Reaffirms Stand On Anglo-American Agreement

THE board of directors of the American Petroleum Institute has recommended that the U. S. Senate ratify the Anglo-American oil agreement in its present form.

The action on the controversial agreement, vigorously opposed by some segments of the industry, was in the form of a resolution passed by the A.P.I. board at its January 22 meeting in Washington.

The resolution was approved after William L. Clayton, undersecretary of state for economic affairs, told the Institute in a letter: "The fears held by some members of the petroleum industry that the agreement, if approved, would provide a basis for government regulation of the petroleum industry, either domestic or foreign, or of the international petroleum trade, or would provide a basis for the extension of the powers of the federal Government, are completely without foundation."

Two years ago the A.P.I. held that the treaty contained no threat to the industry and participation by American oil companies would be beneficial. In view of the questions raised regarding the agreement as a result of statements of some State Department officials, the Institute at its Chicago convention last November decided to ask the State Department for another expression on the agreement's interpretation.

Clayton said that the functions of the International Petroleum Commission proposed under the agreement are "of a consultative and advisory nature" and that "the commission is given no executive authority by the agreement."

"Specifically, it has no right or authority to regulate or control the foreign operations of American nationals, nor in any way to regulate or control the domestic industry of the United States. Neither has it any right or authority to revise existing concession contracts. . . ."

The undersecretary added that the agreement provides no basis "for the claim that ratification. . . . would result in large importations of foreign oil into the United States. . . . May I assure you that the State Department has no policy or program which contemplates the creation of a petroleum body of a regulatory or executive character." *(For further information on Clayton's letter, see Watching Washington, page 37.)*

In other actions at its meeting, the A.P.I. board authorized the refining division to hold a quarterly meeting in April, in Texas, corresponding to a similar meeting of the marketing division already arranged for French Lick Springs, Ind.

William R. Boyd, Jr., A.P.I. president, was authorized to participate with other oil-trade associations before congressional committees in connection with prospective changes in the Natural Gas Act proposed as a result of the Federal Power Commission investigation.

John M. Lovejoy, Seaboard Oil Co. of Delaware, chairman of the public-relations committee of the A.P.I., gave the directors a progress report on the current public-relations program, and a subcommittee was named from the board to raise money for the campaign.

Those named to the subcommittee were R. M. Colley, Atlantic Refining Co.; L. L. Aubert, Bankline Oil Co.; J. F. Drake, Gulf Oil Corp.; J. L. Hamon, Cox & Hamon; C. L. Henderson, Vickers Petroleum Co.; M. H. Robineau, Frontier Refining Co.; C. F. Roeser, Roeser & Pendleton; R. H. Taylor, Union Oil Co.; L. S. Wescoat, Pure Oil Co.; and Ralph Zook, Sloan & Zook.

Industry Asks Exclusive Radio Facilities

WASHINGTON.—A request that the Federal Comunications Commission set aside a band of wave lengths for the exclusive use of the oil industry has been filed by the Petroleum Industry Electrical Association, which was formed in 1928 to promote the industry's communications facilities.

At present oil pipe-line companies can make use of radio bands allocated to utilities in general, but P.I.E.A. attorneys maintained the petroleum industry "requires regular radio service for other functions of the industry, particularly in production operations" and upon a basis "more permanent in character than is presently afforded."

Attorneys cited the cases of remote wells to which construction of telephonic communication is not feasible. Communication during drilling operations, they declared, "is essential in order to maintain proper supervision over drilling operations" and to minimize such hazards as blowouts, fires, and explosions and to save productive time in equipment breakdowns, accidents, or other emergencies."

Radio communication with proven fields, they declared, is necessary to insure "prompt and uninterrupted movement of equipment and supplies, transmission of operating instructions and reports, direction of well-servicing and repair crews and other routine operations."

Other uses cited included automatic transmission of signals from pressure-recording and other instruments at unattended wells and radio-facsimile transmission of electrical-well logs to obtain geological interpretation during drilling.

Unite to Cut Taxes, Oil Industry Advised

SHREVEPORT, La. — Declaring the oil industry is now carrying "all of the tax load it can bear," B. A. Hardy, president of the Independent Petroleum Association of America, last week urged the industry to unite in opposition to "excessive taxation."

Speaking in the closing session of the annual tax forum of the Mid-Continent Oil and Gas Association, Hardy urged officials of the industry to "get together to insure sufficient pressure being brought on Congress to insure relief from excessive taxes for the industry to keep on living."

He sharply criticized federal controls on natural gas and called for a rewriting of natural-gas tax laws "to include restrictions and provisions that will serve as a protection to the whole industry, both oil and gas."

"I feel greatly concerned over the national trend of taxation and the concentration of tax authority in Washington," Hardy said. He suggested also that there is danger of the treasury department taking away the present 27½ per cent depletion exemption which is allowed the industry on tax reports.

John Connolly, St. Paul, member of the tax committee of the United States Chamber of Commerce, joined Hardy in urging a united front to achieve "immediate tax relief." He also called for a reduction in the proposed national budget, asserting it would be impossible to cut taxes 20 per cent unless the budget can be cut to $32,000,000,000.

Texas Co. Buys Barges

Sale of three barges to The Texas Co., New Orleans, for $9,000 each has been announced by the U. S. Maritime Commission.

NPC Rejects Four U. S. Projects, Adopts "Advice Only" Policy

WASHINGTON.—By turning down several requests of the Oil and Gas Division for special committees and projects, the National Petroleum Council clearly delineated its scope and future activities at its quarterly meeting January 21.

The council accepted the report of its agenda committee which laid down the policy that NPC will confine itself to consultation and advice and will not undertake any substantive original work such as collection of statistics; its committees will report only to the council and not the Oil and Gas Division or other government agencies; and committees will not be permitted to consider any matter not submitted to them by the full NPC.

This policy decision cleared away many doubts that the council might run afoul of the antitrust laws and received general approval. The members also were pleased with the welcome given them by Max W. Ball, new director of OGD, and by the election of Walter S. Hallanan as chairman and of H. C. McGowen as vice chairman for the calendar year 1947.

So far OGD has made 11 requests of the council, and of these it has completed work on three (pressure tank cars, materials requirements, and the Mineral Leasing Act), rejected four (flare gas, military products, special problems, and world reserves); and undertaken four more in whole or in part (coordination of statistics, military-fuels evaluation, transportation study, and international metering). Where requests were rejected, the council made constructive suggestions for other approaches to the problems raised.

"The agenda committee points out the limitations upon the council's authority under the exchange of letters between the secretary of the interior and the Department of Justice in regard to the functioning of the council and calls attention to the basic organization procedures established by the council," the report said. "Under these limitations and basic organization procedures the council is not free to appoint committees to which problems may from time to time be submitted without their prior submission to the council itself. The committees so appointed would become agencies of the Oil and Gas Division and would be enabled to bypass the council."

The agenda committee recommended creation of a temporary committee to report back on ways of improving and simplifying the methods of assembling and disseminating petroleum statistics. An earlier report of the committee pointed out that many government and industry organizations now collect statistics and any further work along this line should be done by the Government rather than by NPC.

A new committee was approved to report on the technical evaluation of a study made by the Bureau of Mines and the Air Technical Command regarding the future availability of fuels for military aircraft and refinery capacity for their production.

Oil Policy Committee Rejected

A request for a national oil-policy committee was rejected on the ground that it could serve no useful purpose because the industry's views are already on record in the report of a similar committee of the old Petroleum Industry War Council.

Another OGD request rejected was for creation of a committee to assist in the compilation of information on world-wide reserves and availability of petroleum. The agenda committee suggested that this subject might be touched on by its temporary committee on statistics, but that creation of other committees to deal further with statistical matters should await the report of this temporary committee

Walter S. Hallanan, new chairman of the National Petroleum Council, and Max Ball, who was named director of the Oil and Gas Division of the Department of the Interior early this month

"However," it added, "the agenda committee is of the opinion that a committee of the National Petroleum Council should not be the medium for securing estimates of reserves and availability."

Also flatly rejected was a request for creation of a committee to recommend ways of conserving natural gas, particularly gas wasted in connection with oil production.

"Since conservation regulations are proper functions of the states," the report declared, "the agenda committee feels that the industry should deal directly with the states in such matters and that for the National Petroleum Council as an adviser to the federal Government to make reports to the Oil and Gas Division on such matters, which are within the exclusive jurisdiction of the states, would be going beyond its proper scope. The agenda committee suggests that the Oil and Gas Division can best assist the states in this matter by cooperation with the Interstate Oil Compact Commission."

An urgent request of the Army-Navy Petroleum Board for creation of a special Military Petroleum Advisory Committee was rejected by NPC, but with the suggestion that OGD appoint its own committee of specialists and qualified persons in the industry to give it direct the information and advice sought. This group would deal with such subjects as protection of industry facilities, research on military petroleum projects, and emergency military requirements. The council felt that it should not have a committee which had to do part of its work in secret and submit reports to any agency other than the council itself.

Will Study Transportation

The council accepted, with modifications, the OGD request for a study of petroleum transportation from the standpoint of its adequacy to meet national defense and other emergency needs. The council determined that in view of the competitive nature of the problem it should have separate committees on various phases of transportation, such as rail, barge, pipe line, truck, and tanker, and that these committees should make factual reports only and not recommendations which might appear to give one form of transportation an advantage over another.

The council also approved the appointment of a special committee to consider the adoption of international standards for the measurement of liquid fuels and fuels used for aviation. Request for this was forwarded to OGD by the Civil Aeronautics Administration which is now working on this problem with the Provisional International Civil Aviation Organization.

Creation of the new committees is

expected to be completed shortly, and reports may be made at the next council meeting, which was set for Tuesday, April 15.

One or two more members to represent independent retailers will be appointed to the council soon, Secretary of the Interior J. A. Krug informed the group. Independent-marketing interests already have representation on the council through the heads of several marketing associations, independent-jobber representatives, and refiners with extensive interests in marketing, but the secretary feels that there should be more direct representation of this numerically largest segment of the industry.

The council's committee on pressure tank cars submitted a report in the form of an exchange of letters between the Interior Department and the Office of War Mobilization and Reconversion, giving the committee's recommendation that no further cars be diverted from liquefied petroleum gas service for the Army's fertilizer program, that the cars already so diverted be returned, and that all new pressure tank cars be allocated to L.P.G. service. OWMR replied that no additional diversions would be made, but made no definite promises on the other requests.

The report of committee on materials requirements asked the Government to drop all remaining priorities and similar controls, to postpone its public-works program which competes with industry for scarce materials and to revise labor laws and administrative policies which were blamed for strikes, stoppages, and slowdowns delaying the production of many materials needed by the petroleum industry.

A lengthly report was received from the committee on federal mineral leasing law, which was highly critical of many sections of the regulations recently promulgated by the Bureau of Land Management under the new leasing act.

"The committee emphatically objects to certain of the regulations as entirely inconsistent with, or not warranted by any language contained in the acts of Congress," the report declared. "Some of the objections are fundamental and may necessitate a complete orientation of the viewpoint of the Department of the Interior."

The council also heard brief reports from A. C. Fieldner of the Bureau of Mines on progress of the synthetic liquid-fuels research program, and from T. A. Hendricks of the Geological Survey on the program to explore the continental shelf. Lacking funds for an intensive, 15-year program of the entire area, the USGS will confine itself to demonstrating techniques in an area of 7,000 or 8,000 sq. miles off the Louisiana coast by means of the airborne magnetometer, underwater gravimeter, seismic prospecting, oceanographic work, bottom sampling, and coring, Hendricks reported.

(Comments on the action of the council will be found as a part of Watching Washington, page 37, this issue.)

East Texas Gas-Conservation Problem Is Broadened

by George Weber

DALLAS.—An early solution of the waste-gas problem in East Texas appears unlikely following a meeting of the East Texas Gas Conservation Committee in Kilgore last week. At that meeting the problem was broadened by the possibility that the Railroad Commission of Texas may require complete utilization of residue gas from gasoline plants before enforcing rigid compliance of producers with production schedules issued by gasoline-plant operators.

Up to this time the committee has studied the peaks and valleys of casinghead-gas intake to gasoline plants attending the fluctuation of oil production over daily and monthly periods. An effort to level off gas production by obtaining cooperation of producers has met with success in all but an estimated 15 per cent of producers who continue to produce their allowable during daylight hours and during the first half of the month. This fraction of unscheduled production continues to create peak periods of gas intake which exceeds the capacity of some plants, causing waste of unprocessed gas.

The Railroad Commission issued a notice to all operators and producers in the field October 18, 1946, calling for compliance with producing schedules issued by gasoline plants, but partial surveys of gas production during November and December indicate that although some additional producers complied with the directive, a small minority continued to ignore the schedules, and little material improvement in gas flow resulted.

Into the consideration of means to eliminate such variations by enforcement of uniform production was interposed the necessity for total conservation of gas, i.e. utilization of all residue gas from natural-gasoline plants. Railroad Commission Chairman Olin Culberson, attending the Kilgore meeting, told the committee that the commission in his opinion should not be satisfied with less than such total conservation, and expressed the personal conviction that producers could not be penalized for failure to follow set production schedules until residue gas was fully utilized. When residue gas ceases to be flared, he pledged his full support on the commission to strict enforcement of uniform casinghead-gas production in the field.

Simultaneous Action Needed

Since residue gas use in pipe lines and field operations appears practical only after uniform flow is accomplished, it appears that some common ground must be found on which plant operators, producers, pipe-line purchasers and other interested parties can meet to eliminate simultaneously the production peaks and residue gas waste, if such immediate prevention of gas waste is demanded by the Railroad Commission.

In the consideration of residue-gas use, the possibility of utilizing all such gas in field operations was suggested. Importation of gas from nearby gas fields indicates that much if not all residue gas in East Texas proper may find local use, provided the supply becomes sufficiently uniform to attract purchasers. Accordingly, the committee is now studying gas demand in East Texas and current importations. Data from this survey will be presented at the committee's next meeting, and it is proposed that recommendations arising from such study and the preceding work since May 1946 will be submitted at a following meeting to be attended by the three railroad commissioners.

California's Production Reaches Postwar Record

California oil production in the week ended January 25 reached a new postwar peak with a daily average output reported at 900,500 bbl. daily.

The figure represented an increase of 22,200 bbl. daily over the previous week. California's all-time high production was reached July 21, 1945, with a daily average of 951,500 bbl. daily.

The Oil and Gas Journal's tabulation for the week ended January 25 (see page 93) showed production throughout the U. S. increased 64,035 bbl. to 4,690,045 bbl. daily. California and Kansas were responsible for the gain, Kansas production rising 28,250 bbl. to 285,300 bbl. daily.

this week

THE GOVERNMENT—National Petroleum Council shows its intention to steer its own course without domination by the Government. . . . Quarterly meeting of the council turns down four projects suggested by government agencies. . . . Council says problem of conservation of flare gas belongs to the states, tells military it should form its own group of experts to study oil supply. . . . Confidence in the council increases as a result of the meeting. . . . Hallanan takes over as permanent chairman, H. C. McGowen named vice chairman. . . .

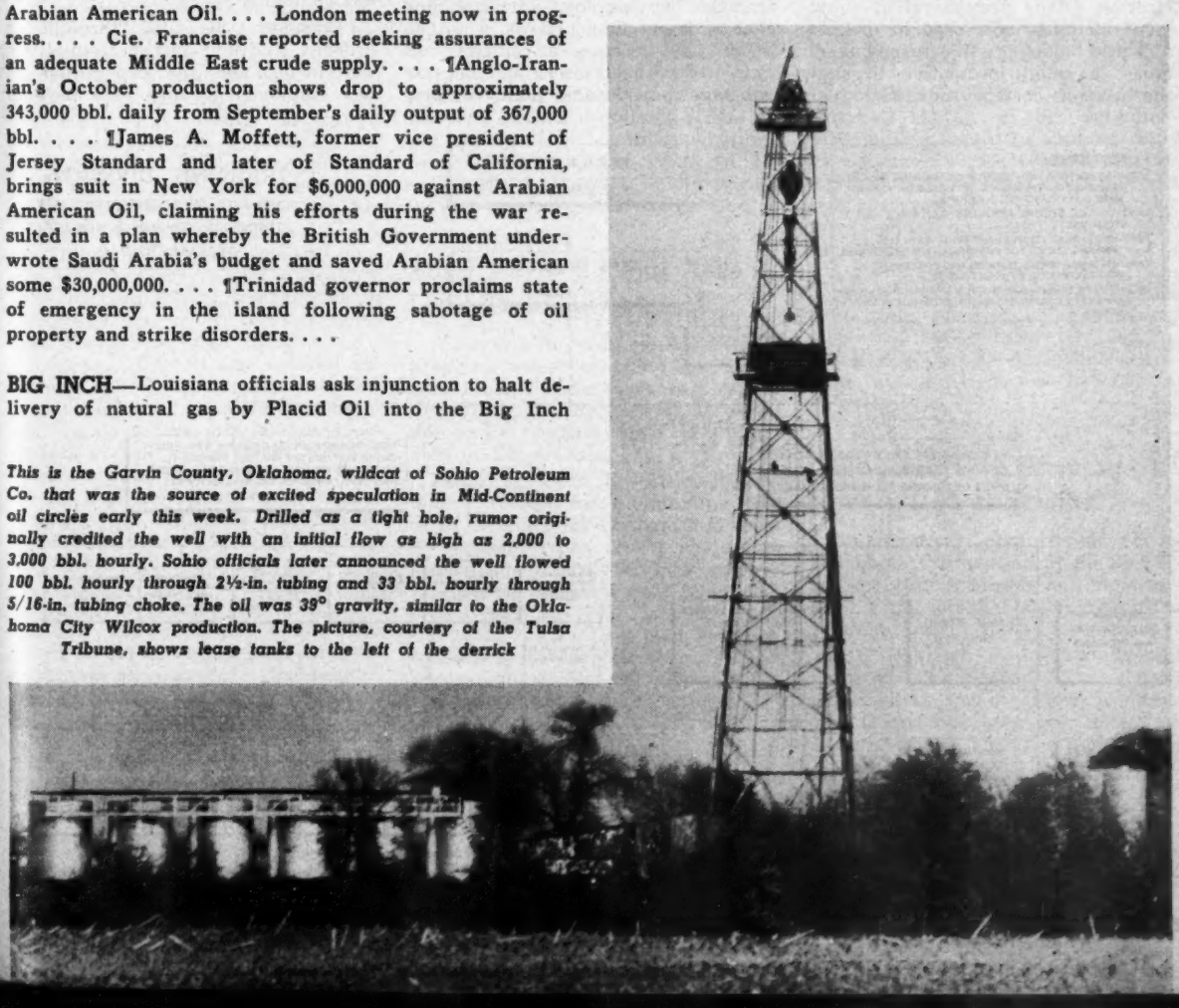
THE TREATY—A.P.I. board of directors again goes on record favoring Anglo-American agreement in its present form. . . . Resolution passed at board's Washington meeting following receipt of letter from William L. Clayton, undersecretary of state, saying agreement contains no threat to domestic industry or basis for regulation of foreign petroleum trade. . . .

INTERNATIONAL—Indications point to out-of-court settlement of legal action brought in British court by Cie. Francaise des Petroles to block proposed purchase by Jersey Standard and Socony-Vacuum of interest in Arabian American Oil. . . . London meeting now in progress. . . . Cie. Francaise reported seeking assurances of an adequate Middle East crude supply. . . . ¶Anglo-Iranian's October production shows drop to approximately 343,000 bbl. daily from September's daily output of 367,000 bbl. . . . ¶James A. Moffett, former vice president of Jersey Standard and later of Standard of California, brings suit in New York for $6,000,000 against Arabian American Oil, claiming his efforts during the war resulted in a plan whereby the British Government underwrote Saudi Arabia's budget and saved Arabian American some $30,000,000. . . . ¶Trinidad governor proclaims state of emergency in the island following sabotage of oil property and strike disorders. . . .

BIG INCH—Louisiana officials ask injunction to halt delivery of natural gas by Placid Oil into the Big Inch system. . . . Move follows attempt of conservation commissioner to cancel gas allowable granted H. L. Hunt, operator of the company. . . . State contends flow of gas out of state violates long-standing policy. . . .

PRODUCTION—California's output in week ended January 25 hits postwar high of 900,500 bbl. daily. . . . U. S. production during week rises 64,035 bbl. to 4,690,000 bbl. daily. . . . Kansas Supreme Court rules Corporation Commission has authority to fix minimum well allowable above 15 bbl. daily. . . . Legislature expected to receive proposal that it fix minimum at 25 bbl.

EXPLORATION—Sohio Petroleum's wildcat in Garvin County, Oklahoma, flows 100 bbl. of oil an hour initially, 33 bbl. hourly through choke. . . . New field on threshold of Anadarko basin may lead to important discoveries in basin's deeper section. . . . ¶West Texas strike opens second productive area in Hale County. . . . Stanolind Oil & Gas discovery well swabs oil at rate of 8 bbl. per hour from Wolfcamp sand. . . . ¶Recovery of bleeding cores from Dakota sand in northwestern New Mexico wildcat indicates new oil field for San Juan County. . . .



This is the Garvin County, Oklahoma, wildcat of Sohio Petroleum Co. that was the source of excited speculation in Mid-Continent oil circles early this week. Drilled as a tight hole, rumor originally credited the well with an initial flow as high as 2,000 to 3,000 bbl. hourly. Sohio officials later announced the well flowed 100 bbl. hourly through 2½-in. tubing and 33 bbl. hourly through 5/16-in. tubing choke. The oil was 39° gravity, similar to the Oklahoma City Wilcox production. The picture, courtesy of the Tulsa Tribune, shows lease tanks to the left of the derrick

Esso Training Center Designed To Develop Company Leadership

ELIZABETH, N. J.—Again emphasizing their belief that employes are the greatest single company asset, top-ranking officials of Standard Oil Co. (N. J.) and its largest domestic operating subsidiary, Standard Oil Co. of New Jersey, were hosts last week to New York newspapermen and magazine writers for a tour of the new Esso Training Center here in Elizabeth.

At this training center, Jersey Standard employes from all over the United States and foreign countries as well, will be given specialized 2-week courses which will enable them to become better managers, supervisors and eventually to fit some of them for executive positions.

While Jersey Standard has been giving employes field instruction for the past 25 years, this is the first time that a training center, as such, has been organized. Here, model replicas of a distillation plant, a "cat" cracker and an alkylation plant provide easy methods of actual demonstration. Other demonstration equipment includes tools used in drilling; a world map of the principal oil areas; a small locomotive to show the use of certain industrial fuels and lubricants; and various motors which are so rigged as to graphically indicate the effect of leaded and unleaded gasoline on power, knock and pickup.

Among other training aids are motion picture films, slides and well-illustrated charts. The conference method, with not more than 15 men in any single class, has been found the most effective. About 75 skilled conference leaders are currently at the training center. Trainees are mostly selected for the 2-week course by their supervisors and on the basis of past work, with the thought that eventually these men who have evidenced leadership abilities, will be in supervisory positions.

About $400,000 will be spent at the Esso Training Center in 1947 and around $500,000 in 1948.

In making the introductory remarks at a pretour luncheon, M. J. Rathbone, president of Jersey's operating company, pointed out that in the Jersey companies there is an extremely low employe turnover and that it is no longer news when an office boy becomes a company official. "For that reason, and because we have a traditional policy of promotion from within, we need to provide the training necessary efficiently to maintain this plan," Rathbone said, adding:

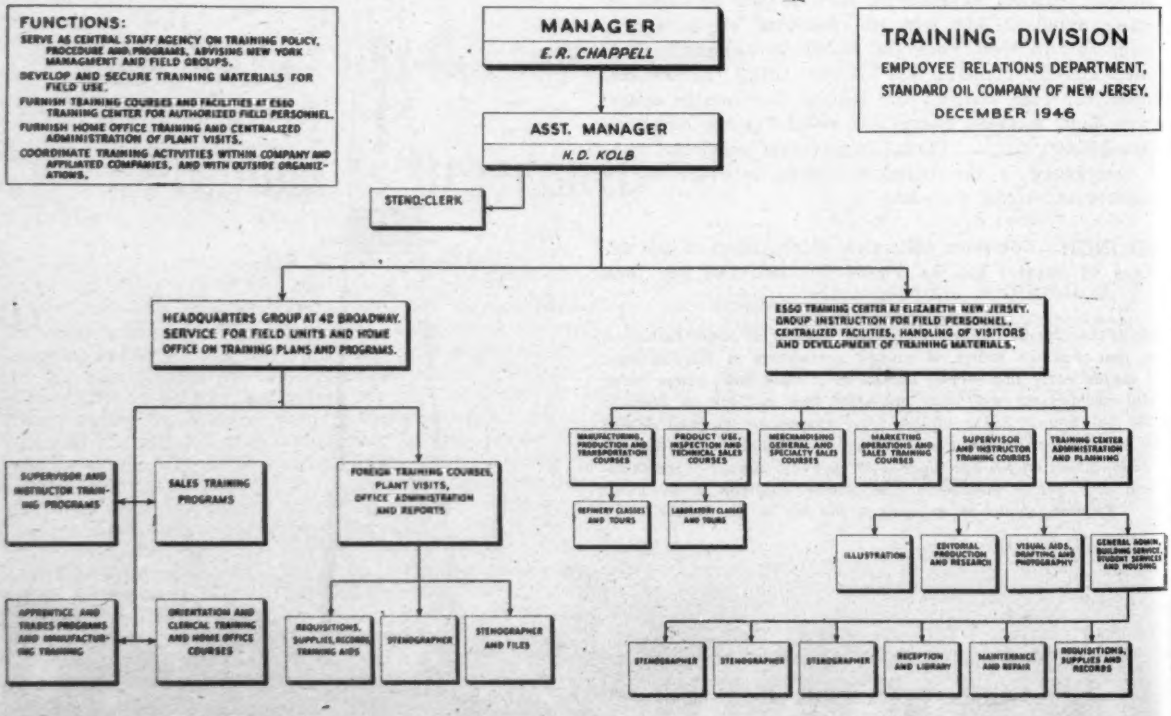
"We need to increase the capacity of our people to produce because therein lies the way toward higher production and lower costs. We want to help our people because we recognize that the desire to produce is even more important than the skill to produce."

Special Courses for Veterans

Rathbone said that the company wanted to induce the young engineer and the young scientist to join it, and at the same time it recognized an obligation to assist them in their technological advancement. "This we will do," he said, "by special courses, such as the one recently held in chemical engineering for returned veterans who felt they needed it to bring them up to date after long periods in the service."

Pointing out that centralized training is but one phase of the over-all program of personnel development which starts with the orientation of new employes and continues to the highest echelons with the executive-development program, Rathbone emphasized that "there is no substitute for on-the-job instruction and that remains the backbone of training in our company."

"However," he said, "through an orderly study of our personnel requirements and the capabilities of our employes, we are able to plan


FUNCTIONS:
SERVE AS CENTRAL STAFF AGENCY ON TRAINING POLICY, PROCEDURE AND PROGRAMS, ADVISING NEW YORK MANAGEMENT AND FIELD GROUPS.
DEVELOP AND SECURE TRAINING MATERIALS FOR FIELD USE.
FURNISH TRAINING COURSES AND FACILITIES AT ESSO TRAINING CENTER FOR AUTHORIZED FIELD PERSONNEL.
FURNISH HOME OFFICE TRAINING AND CENTRALIZED ADMINISTRATION OF PLANT VISITS.
COORDINATE TRAINING ACTIVITIES WITHIN COMPANY AND AFFILIATED COMPANIES, AND WITH OUTSIDE ORGANIZATIONS.
MANAGER
E. R. CHAPPELL
ASST. MANAGER
H. D. KOLB
STENO-CLERK
TRAINING DIVISION
EMPLOYEE RELATIONS DEPARTMENT,
STANDARD OIL COMPANY OF NEW JERSEY.
DECEMBER 1946
HEADQUARTERS GROUP AT 42 BROADWAY. SERVICE FOR FIELD UNITS AND HOME OFFICE ON TRAINING PLANS AND PROGRAMS.
ESSO TRAINING CENTER AT ELIZABETH NEW JERSEY. GROUP INSTRUCTION FOR FIELD PERSONNEL, CENTRALIZED FACILITIES, HANDLING OF VISITORS AND DEVELOPMENT OF TRAINING MATERIALS.
SUPERVISOR AND INSTRUCTOR TRAINING PROGRAMS
SALES TRAINING PROGRAMS
FOREIGN TRAINING COURSES, PLANT VISITS, OFFICE ADMINISTRATION AND REPORTS
APPRENTICE AND TRADES PROGRAMS AND MANUFACTURING TRAINING
ORIENTATION AND CLERICAL TRAINING AND HOME OFFICE COURSES
REQUISITIONS, SUPPLIES, RECORDS, TRAINING AIDS
STENOGRAPHER
STENOGRAPHER AND FILES
MANUFACTURING, PRODUCTION AND TRANSPORTATION COURSES
PRODUCT USE, INSPECTION AND TECHNICAL SALES COURSES
MERCHANDISING GENERAL AND SPECIALTY SALES COURSES
MARKETING OPERATIONS AND SALES TRAINING COURSES
SUPERVISOR AND INSTRUCTOR TRAINING COURSES
TRAINING CENTER ADMINISTRATION AND PLANNING
REFINERY CLASSES AND TOURS
LABORATORY CLASSES AND TOURS
ILLUSTRATION
EDITORIAL PRODUCTION AND RESEARCH
VISUAL AIDS, PRINTING AND PHOTOGRAPHY
GENERAL ADMIN., BUILDING SERVICE, STUDENT SERVICES AND HOUSING
STENOGRAPHER
STENOGRAPHER
STENOGRAPHER
RECEPTION AND LIBRARY
MAINTENANCE AND REPAIR
REQUISITIONS, SUPPLIES AND RECORDS

This chart shows the organization of the training division in Standard Oil Co. of New Jersey's employe relations department

continually for upward progression by special training courses and job-rotational systems.

"Schedules are established showing experience requirements, and potential incumbents for many of the positions in the company, and action is taken regularly to move the scheduled men from job to job in order to provide them with broad background and rounded experience. This carries on until it is embodied in the executive-development program in which even plant managers receive assignments to broaden their knowledge of our organization."

Turning towards the actual philosophy of the center training, Rathbone said: "To begin with, the supervisor is the key man and we recognize that by putting unusual emphasis on supervisor training. We believe that many of the programs of the past have been on too broad a discussion basis, and have fallen short of providing specific training in the real skills of the handling and supervision of people as individuals."

William Nadden, a vice president and director of Jersey's operating subsidiary, heads up employe relations. E. R. Chappell is manager of the center with Harry D. Kolb as assistant. D. V. Ward is director.

Gossett Presses Campaign Against Reserved Mineral Rights

WASHINGTON. — The constitution of the United States, unlike some other countries, does not reserve all subsoil minerals to the national Government, and neither do any federal laws or regulations, thanks almost entirely to the one-man campaign waged by Rep. Ed Gossett of Texas.

Last year when the Surplus Property Act was passed, Gossett got through an amendment requiring the Government to sell all land in fee simple, without reservation of mineral rights. But recently he noticed some press releases of War Assets Administration announcing that various airfields and other tracts had been sold with the mineral rights reserved. He moved in on WAA promptly and got an admission that this was contrary to law, a promise that the contracts of sale and deeds would be amended, and assurance that it will never happen again.

Last year Gossett also secured enactment of a section in another law prohibiting the reservation of mineral rights in the sale of lands acquired by the Government through foreclosure of home or farm loans or for soil conservation or similar purposes. He thinks he now has all loopholes plugged, and the Government can retain oil and gas rights only to the public domain proper. However, it appears that there are quite a few government employes down at the operating level who believe that oil belongs to "the peepul" and therefore the federal Government should own it whenever possible.

The total amount of oil underlying the scattered tracts of land which the federal Government has acquired in various ways is probably negligible in volume. The difficulty comes when a prospector attempts to assemble a block of leases for wildcatting. Like as not he finds a little tract right in the middle of the block which the owner purchased from the Government with mineral rights reserved, and it is never possible to locate a government official who admits the authority to lease the oil rights to this parcel. If this results in a "hole" in the acreage right at the best site for a wildcat it means plenty of trouble for the driller. This reservation of mineral rights on scattered land sales has long been a complaint of the oil industry, and has nothing whatever to do with the larger policy of development of oil on the public domain in the so-called public land states.

Ethyl Corp. Official Asks Lead Tariff Adjustment

A request that lead be added to the proposed reciprocal-trade agreement negotiation list has been made to the Committee for Reciprocity Information by Dr. Graham Edgar, vice president of Ethyl Corp.

Declaring there is "little, if any, logical reason for maintaining any tariff on lead," Dr. Graham said there is "certainly every reason against an increase in tariffs." With the expiration of the national emergency, declared May 27, 1941, Dr. Edgar said the tariff on metallic lead automatically will be increased to 1.7 cents per pound unless, through negotiations, the tariff might be adjusted.

Inch Lines' Gas Allocation Changes to Be Considered

The problem of a reported serious shortage of natural gas in the area served by East Ohio Gas Co. is scheduled to be laid before the Federal Power Commission's industry-advisory committee on allocation of natural gas from the Big Inch and Little Big Inch lines.

The committee was asked to meet January 31 to consider further allocation, or changes in allocation, of gas flowing through the government-owned lines, now operated by Tennessee Gas & Transmission Co. under temporary lease.

Latest reports indicate a flow of more than 125,000,000 cu. ft. daily through the two lines, FPC said.

New Kettleman Hills Producing Zone Found

LOS ANGELES.—Discovery of a new deep producing zone on Kettleman Hills Middle Dome in Kings County, California, has been announced by Standard Oil Co. of California acting as drilling contractor for the Middle Dome Association Unit Plan.

Standard said the well, 73-30V, flowed on test at an estimated rate of 500 to 1,000 bbl. daily of 35°-gravity crude. The successful test indicates a new producing field from sands of Eocene age.

Gasoline Consumption Sets Record in 1946

WASHINGTON. — United States motorists set an all-time gasoline-consumption record in 1946 by using an estimated 25,200,000,000 gal., an increase of approximately 31 per cent over 1945 and about 4 per cent above the previous high record of 24,200,000,000 set in 1941.

According to a survey by the Public Roads Administration, revenues from state gasoline taxes increased more than $240,000,000 over 1945, totaling $1,025,000,000 during 1946. Previous all-time high was $957,000,000 in 1941.

Oklahoma City Forming New A. I. M. E. Section

A temporary organization of an Oklahoma City section of the American Institute of Mining and Metallurgical Engineers has been set up to create a second Oklahoma section.

E. G. Dahlgren, of the Interstate Oil Compact Commission, was named chairman of the organizing committee. Other members are Robert J. Beams, Shell Oil Co., Inc.; David Dooley, Stanolind Oil & Gas Co.; and Dr. John C. Calhoun, University of Oklahoma. The Oklahoma City section would include the western half of Oklahoma. The Tulsa section now includes all of Oklahoma and Kansas.

International

WORLD-WIDE OIL DEVELOPMENTS

Moffett Asks $6,000,000 in Arabian American Suit

NEW YORK.—Seeking $6,000,000 for services which he states were rendered in 1941, James A. Moffett, well-known oil man and former federal housing administrator, filed a suit here, January 23 against Arabian American Oil Co. in the U. S. District Court.

In the complaint it is said that as a result of Moffett's services, Arabian American obtained protection of the Arabian concession and that the British Government was induced to assume the $10,000,000 annual budget of the Kingdom of Arabia during the war.

Up until April 1941, Arabian American, according to Moffett's suit, had lent the country of Arabia about $1,000,000 to meet expenses. During the first 3 months of 1941, the bill continues, the king advised the company that his annual minimum budget, during the war would be $10,000,000 and that he expected the company to supply him with at least $6,000,000 of that sum as an advance against concession royalties to be accrued. Failure to meet the king's request, Moffett says, would have seriously jeopardized the concessions.

On April 1, 1941, Moffett continues, the company hired him to protect its concessions and obtain relief from the king's financial demands, and agreed to pay him "the fair and reasonable value of his services." And as a result of his efforts, Moffett says, he saved the company at least $30,000,000 in cash and its concessions.

Moffett also filed two actions seeking a total of $2,135,000 for past services and alleged slander from an array of defendants all connected directly or indirectly with Standard Oil Co. of California and The Texas Co. (joint owners of Arabian American) and affiliates.

Moffett is a former vice president of Standard Oil Co. (N. J.) and also has held the same position with Standard Oil Co. of California.

Geology Favorable in Southwest Russia

NEW YORK.—The geological structure of southwestern Russia indicates the possibility of major oil pools in that area, according to a recent issue of a Soviet scientific publication translated in part here.

A rereading of the Russian literature on drilling and gravimetric observations would seem to indicate that the numerous deposits of natural gas in the Caspian-Caucasian-Crimean area are not essentially local, the American Russian Institute stated, explaining:

"The fact of widespread flat Tertiary and Quaternary formations in this region is entirely deceptive. Underneath these formations are systems of folds, made up of rocks up to and including Mesozoic age which are in unconformity with the Tertiary-Quaternary series.

"The angular relationship is not confined to the fact that the Tertiary deposits lie on the beveled peneplain, there are buried ranges in this area, and these are exemplified by the buried range discovered by Karpinski and studied by Golynets and Uspenski, east of the Caucasus, and by the fact that drillers operating from the Tertiary-Quaternary surface strike the pre-Cambrian basement-complex at depths of only 2,000 meters (6,560 ft.).

"This vast folded system, with its huge number of possible accumulation traps for oil, stretches from the Caspian Sea to midway between the mouth of the Danube and the Balkan Mountains."

Socony-Vacuum Buys Army Stocks in Azores

NEW YORK.—Confirming a report from Paris that thousands of barrels of petroleum products and 90,000 heavy steel drums on Santa Maria Island in the Azores, have been purchased by Socony-Vacuum Oil Co., Inc., a spokesman here said that the material consists of surplus U. S. Army supplies declared unrecoverable by the U. S. Foreign Liquidation Office last fall after a tropical hurricane wrecked island installations.

The supplies, which are estimated to have cost the U. S. $1,349,000, have been sold for $556,000. Socony-Vacuum runs a refueling service on Santa Maria and through the deal obtained 48,000 bbl. of aviation gasoline and about 24,000 bbl. of automotive gasoline, lubricating oil, brake fluid and cleaning solvents, as well as the drums. The Portuguese Government has been a large purchaser of surplus petroleum products in the Azores.

Big Exploration Project Slated for New Guinea

Exhaustive oil exploration operations in New Guinea, expected to cost more than $1,500,000, will be undertaken soon by Australian Petroleum Co., according to C. Saunders, managing director of the comapny.

The operations, supported financially by three major oil companies, will be the largest such project ever carried out in Australian-controlled territories. Two complete rigs now are being assembled in the United States and Great Britain to supplement drilling equipment already in the area to be explored.

Saunders said the company will begin operations at Kariava, on the southern coast of Papua about 70 miles up the Vailala River.

Arabian American Oil Co. is currently acting as host to Saudi Arabia's Crown Prince Saud Al-Saud who is on a month's tour of the United States, visiting oil fields, refineries, and other points of general interest. Above the prince is shown shaking hands with James Terry Duce, vice president of Arabian American

Out-of-Court Settlement Sought In Cie. Francaise Suit

by Warren W. Burns

ALTHOUGH Cie. Francaise des Petroles has formally lodged a protest in the British courts seeking to halt Middle East oil negotiations whereby Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc., would become partners in the Arabian American Oil Co., indications are that the two American companies and Cie. Francaise will continue to take steps toward an out-of-court settlement. If this is accomplished the legal protest undoubtedly will be withdrawn.

Meanwhile, reports are that Jersey Standard and Socony-Vacuum may consummate the Arabian American deal in the very near future.

These two American companies, as joint owners of the Near East Development Corp., are partners of Cie. Francaise in the Iraq Petroleum Co., Ltd. The French partner's protest is over the postwar status of the "Red Line Agreement"—a clause in the Iraq Petroleum contract—which Jersey Standard and Socony-Vacuum hold no longer exists because of the technical enemy alien status of France during the war.

At present, meetings are being held in London with officials of all companies concerned in an effort to thrash out their differences amicably.

Perhaps it will be possible for the companies to come to some common agreement if Cie. Francaise is assured that its two American partners in Iraq Petroleum will continue to give whole-hearted support to all future Iraq Petroleum developments and that the Iraq company won't suffer when current negotiations are consummated.

Specifically, Cie. Francaise would like to be assured of the opportunity of participating, in some manner, in the purchase of Arabian crude. That Cie. Francaise will never be a partner in Arabian American is practically certain, for it is known that the parent companies of Arabian American (Standard Oil Co. of California and The Texas Co.) definitely do not wish to be involved in any commercial arrangement whereby a government would be an active participant.

The crux of the entire situation is the race for European markets, a race which will see several oil companies as active contenders. And if the trans-Arabian "big inch" results in Jersey Standard and Socony-Vacuum obtaining a "head start," in supplying the European markets, then Cie. Francaise also wants to be assured of some equal opportunity.

By the end of 1947, Cie. Francaise probably will have a 60,000-bbl. daily refining capacity. And at least until the completion of the 16-in. Kirkuk-Mediterranean pipe lines, which will parallel the existing 12-in. lines to Tripoli and Haifa, Cie. Francaise cannot be assured of sufficient crude.

Cie. Francaise hasn't overlooked the fact that Arabian American is an affiliate of the same companies (California Standard and Texaco) which hope to capture a good share of the European oil market through the newly organized Caltex Oceanic, Ltd. (The Journal, January 18, p. 43.)

There also is the fact that Jersey Standard and Socony-Vacuum are negotiating with Anglo-Iranian Oil Co., Ltd., (also a partner in Iraq Petroleum) for a 10 to 20-year crude-oil purchasing agreement. And while this does not violate the "Red Line Agreement," in that Iran is outside the line, Cie. Francaise knows that Anglo-Iranian has refining interests in France and that the British company too will stand to gain by the projected pipe line from Iran to Mediterranean. Construction of this second Middle East "big inch" now seems a certainty. When all this is coupled with the fact that the Royal Dutch-Shell (which as Anglo-Saxon Petroleum Co. is a partner in Iraq Petroleum) is now lifting 20,000 bbl. daily from Kuwait, and that the additional Kirkuk - Mediterranean 16 - in. pipe lines will not be completed before 1950, the attitude of Cie. Francaise continues to be more than watchful waiting.

Supporting Cie. Francaise, but not yet in a legal manner, is C. S. Gulbenkian, the minority (5 per cent) shareholder in Iraq Petroleum.

Gulbenkian, born an Armenian and whose enemy alien status was also a question of some doubt by Iraq Petroleum partners, reportedly has been compensated, nevertheless, for his 5 per cent share of Iraq crude produced during hostilities. During the war Gulbenkian took out citizenship papers in Iran.

Cie. Francaise, which also maintains that it should be compensated for crude oil withdrawn from Iraq during the war, in that Nazi capture of the French Government was out of its control, has not yet received any formal assurance that its claim will be settled.

The importance of the Cie. Francaise protest has taken on added significance since the United States undersecretary of state repudiated a spokesman for telling the press that the French Government protests probably would not be answered by the U. S. Government in that it was regarded as purely a commercial matter. It now seems that quite the contrary is true. But it is likely that no official statement will be forthcoming until the State Department is apprised of the outcome of the current London negotiations.

Former Official Discloses U. S. Wartime Efforts to Buy Arabian American

by Henry D. Ralph

WASHINGTON.—The Anglo-American petroleum treaty which has caused so much apprehension on the part of the American oil industry had its origin in the fear of Standard Oil Co. of California and The Texas Co., during the early days of World War II, that they might not be able to hold their relatively new concession in Saudi Arabia.

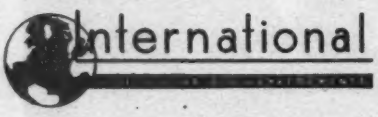
But between this fear and the treaty now pending in the Senate came the even more alarming episodes of the Petroleum Reserves Corp., the attempt of the Government to buy into the concession, and the proposal for a government-owned pipe line across the Arabian Peninsula.

These are among the revelations in the "inside story" of the oil of the Middle East given by Dr. Herbert Feis in a new book, "Seen from E.A." (Alfred A. Knopf, New York.) As economic adviser ("E.A.") of the State Department during most of that period, Feis sat in on most of the secret interdepartmental conferences concerned with the economic side of the war. Though he left the department before the Anglo-American agreement finally jelled, he had a hand in almost everything that led up to it.

How Harold L. Ickes as petroleum administrator for war grabbed the ball and ran with it once he got into the Middle East oil game is told in considerable detail, and not especially to his credit. Though he writes in philosophical retrospect, Feis obviously was quite annoyed with Ickes and practically blames him for the major mistakes throughout. As a matter of fact, the reader gets the impression that if the economic adviser had been heeded more often the war might have been much shorter and less troublesome, but this does not greatly detract from the chronology.

"Seen from E.A." bears the subtitle "Three International Episodes," the other two being the efforts to stockpile crude rubber before Pearl Harbor and the attempt to impose economic sanctions on Mussolini when he invaded Ethiopia. In all of them the economic adviser seems to have been a voice crying in the wilderness against the shortsightedness of other government officials.

The basic reason for all the excitement and devious negotiations over



Middle East oil, Feis asserts, was the assumption that for adequate defense the United States must have actual physical control of adequate and properly located sources of petroleum, and he recalls that the cycle of alarm over a possible oil shortage which occurred after the 1918 war repeated itself during World War II.

"All the uneasiness found expression in the question launched by the petroleum administrator for war, would the United States be able successfully to oil another war?" Feis writes, "He may have intended the query as a stimulant to action rather than an expression of anxiety. But fears clustered about it and more frightening utterances competed with it for attention. . . . Such thoughts stirred an impatient wish for protective action."

"Awesome Oil of Middle East"

The "awesome oil of the Middle East," where the Arabian American Oil Co. had uncovered amazingly rich reserves, held much hope, but Feis declares:

"Despite these omens of favorable future fortune, the executives of the company were not at ease. Their words, as they conversed with government officials, unlocked a storeroom of worries.

"They felt that their operations were at the mercy of British diplomacy, at a competitive disadvantage, and at the hazard of local disorders and levies. . . . They longed for assurance that the signed concessions should have a stronger basis than the will of a mortal and impetuous ruler—preferably the assured support of the American Government. . . . Light is the spirit of the driller, dark the thoughts of the owner of the treasure."

Early in 1943, Feis reveals, the best way to protect American oil concessions in the Middle East became the most absorbing concern of the Interdepartmental Committee on Petroleum.

"The owners of the Arabian American Oil Co. had made a proposal that appealed to the economic adviser. They offered to grant the American Government an option to buy a great quantity of the oil that lay underground in Saudi Arabia whenever it might choose to do so, at a discount from the market. . . . This offer, it was easy to perceive, was prompted by the wish to gain semiofficial status for the concessions. . . . The proposal seemed to have several advantages. . . . it would in no way interfere with their regular business, or cause the Government to become an active element in the oil business.

"But this option-contract arrangement was not thought adequate by the representatives of other government departments. . . . They argued that if the Government accepted such an obligation it ought to be certain that the company conducted its affairs with due regard for the welfare of Saudi Arabia and put the interest of the United States above its own. . . .

"This train of judgment came to a bold conclusion. The American Government should buy the companies that held the rights to develop the oil of Saudi Arabia and Bahrein.

"The representatives of the petroleum coordinator (Ickes) and the Navy stood firm on what appeared to them simple indisputable propositions: the oil was there; the United States might need it; the best way to make sure that it could be had if and when wanted was for the Government to buy and defend it; and such a course could properly offend no one."

At this point, Feis says, he became aware that two of the participants (obviously Ralph K. Davies, deputy petroleum administrator, and Max Thornberg, then petroleum adviser of the State Department) had been connected with Standard Oil Co. of California. Fearing this would make the committee vulnerable to criticism, Feis disbanded it. A new group was formed, headed by the undersecretary of war (Robert P. Patterson) and including the undersecretary of the interior (Abe Fortas), and with Feis apparently playing a much less important role. However, this group could not agree whether to accept Aramco's offer of a reserve or to buy it out. So the issue was taken to the White House.

"On a hot July afternoon (1943),

when the roses in the circular garden outside the windows of the executive offices stood straight and still in the breathless air, the president gave his authority to the more intrepid line of action. The proposal to try to buy a stock of the Arabian American Oil Co. was selected as the least ambiguous and most effective way to increase the security of our future oil supply. The discussion was jovial, brief, and far from thorough. . . ."

Feis and Ickes were designated to negotiate to purchase the stock of both Arabian-American and Bahrein Petroleum.

At this point the Petroleum Reserves Corp. was formed because it was felt that a government corporation could best handle business activities and finance the new pipe lines and refineries that were then contemplated. The PRC was formed by representatives of the State, War and Navy departments, PAW, foreign economic administrator (Leo T. Crowley), and—for a brief time—the federal loan administrator (Jesse Jones).

It was not easy to fit these departments together into a new pattern of authority, Feis says, and he tells how Ickes crowded Jones out of the picture.

"The petroleum administrator for war assumed the presidency of the new organization. . . . And anxiety existed, and not for the first time, in certain parts of the State Department as to what that assertive spirit might do. . . ."

Negotiations for purchase of the stock went on fitfully through the whole summer of 1943 "impelled by the taciturn will of the petroleum administrator and the eagerness of the secretary of the Navy," but the companies refused to sell. "They had gone fishing for a cod and caught a whale."

First PRC offered to buy all the stock, but the companies flatly refused. A second offer to buy a majority of the stock but let the companies manage the commercial end of the operation was rejected just as promptly. Then PRC sought to reach its objective by trying to buy into the Gulf Oil Corp.'s concession in Kuwait, but without result. In September Ickes made an offer to buy one-third of the stock of Aramco and Bahrein. Ickes was so sure this would be accepted that he had a mission all ready to fly to Arabia, but the companies rejected this and withdrew from further discussions.

"Waves of silence were permitted to wash the memory clean," Feis observes, and "thought turned to other means of achieving the ends."

Early in 1943, before all this happened, Feis says, he and others in the State Department had concluded that the best way to achieve international order in oil and protect American concessions was to get an agreement on the subject, starting with Great Britain and later including other nations. They prepared a draft of a simple treaty to provide voluntary consultation between governments and voluntary cooperation of oil companies, with no intention of subjecting oil companies to international control or further regulation by the U. S. Government.

This version of the origin of the Anglo-American petroleum treaty does not jibe completely with that told by Ickes, who has given the impression that he fathered it and the State Department balled it up.

Feis relates that Ickes took no interest in the treaty approach until failure of the stock-purchase attempt, but then he appeared to endorse it. However, just as Feis was about to leave for London in October 1943, to prepare the way for an agreement, the whole matter was dropped because, it developed later, Ickes had a new idea.

Pipe-Line Plans

This was a plan for the Government to build a pipe line across Arabia to the Mediterranean. On February 6, 1944, Ickes announced to a surprised world that PRC had reached an agreement in principle with Arabian-American to build such a line. Although Ickes' announcement said the plan had the approval of the State Department and several other government agencies, Feis says he had no advance notice of it and "was not informed of the reason for what appeared to him the wrong way of proceeding."

Neither were oil interests and foreign governments, and "objections gushed out of the ground" from every quarter.

"Virtually the whole of the American oil industry condemned the proposed measure as needless and unfair . . . The two great American oil companies [Standard Oil Co. (N. J.) and Socony-Vacuum] that in partnership with Anglo-Dutch and French interests operated in other Middle East countries regarded the proposal as an unjust blow.

"The petroleum administrator for war retreated in stunned indignation. The other government agencies whose support had been displayed in the original announcement said little . . . The prevailing judgment of the Senate became evident. It was thoroughly against the agreement in the form proposed . . . The President, in June (1944), promised that he would not proceed to give further effect to the pipe-line agreement without advance notice. The notice was never given.

"The drafts for an international agreement on petroleum that had been permitted to draw dust during the excitement over the pipe-line project were recalled and retouched. Officials who had been indifferent became animated. The State Department emerged from the shadows where caution had found refuge. The British Government was invited to send experts to the United States to discuss the possible terms of a petroleum agreement. It was announced—the better to appease or outwit opponents of the idea—that the discussions would be merely on a 'technical level.'"

Though Feis had left the department at that time, he describes the negotiation of the treaty during the spring of 1944, saying the American delegation was over-numerous and ill-assorted, there was ambiguity of aim, and lack of ease between the secretary of state (Hull) and the petroleum administrator.

The agreement signed August 8, 1944, is severely criticized by Feis. He admits its purpose was good but compares its language to a futuristic painting. "It was daring in one way, timid in another, and obscure in general."

Feis says the American oil industry was justified in its opposition to the agreement, not because of its intended purpose but because of all the things that might well be read into its fuzzy language. He admits that some officials in the State Department had favored making the agreement into a "super-cartel," and declares that the signed text "retained a whiff of the idea."

After the first agreement was withdrawn from the Senate, events showed that the Arabian concession was in little danger from the German, British, or Saudi Arabian governments, that the Arabian-American Oil Co. could develop its property without government assistance, and that U. S. diplomatic support could be expected without government partnership, Feis explains, so nothing more was done until September, 1945, when Ickes headed a new delegation to London to revise the agreement.

The treaty now pending in the Senate is praised by Feis as retaining the principles of the original idea but abandoning the features that caused so much criticism, particularly with regard to the functions of the proposed International Petroleum Commission.

"Presumably the commission would be permitted to 'report' ideas and proposals as well as simple fact; presumably it will be permitted to think out loud. The language of the accord is not as clear as it might be on this point. The intention of the authors was to calm the fear of the American oil producers that the commission might become a licensed source of disturbing suggestion."

Sohio Discloses Oklahoma Wildcat Flowing 33 Bbl. per Hour

by Charles J. Deegan

DEFLATING the wild rumors that had circulated for a week, Sohio Petroleum Co. announced that its Garvin County, Oklahoma wildcat, 1 Howard, SE SE NW 17-1n-2w, near Eola, was flowing 33 bbl. per hour through a 5/16-in. tubing choke on 2½-in. tubing, from 140 ft. of saturated sand in the Basal bromide of the Ordovician. Rumors had previously soared as high as 2,000-3,000 bbl. per hour.

Official reports stated that on first tests, the well flowed 100 bbl. per hour through open 2½-in. tubing, oil 39° gravity plus, light color, similar to Oklahoma City Wilcox oil in general appearance. After cleaning itself, the well flowed 55 bbl. per hour for 36 hours through ½-in. tubing choke; followed by a second 36-hour test through the 5/16-in. choke, which averaged 33 bbl. per hour. Tubing pressure was 800 psi. through ½-in. choke, 1,100 psi., through 5/16-in. choke; casing pressure still building up in annulus; gas-oil ratio on final test 800 cu. ft. per barrel; water grindout less than 0.2 per cent.

Total depth is 10,234 ft., in the upper McLish dolomite, which was topped at 10,202 ft., after going out of the producing horizon, the Basal Bromide sand. The 5½-in. producing string is set at 10,064 ft., 4 ft. below the top of the Basal Bromide at 10,060 ft. This gives the Bromide pay zone a thickness of 140 ft., all saturated.

Hard, Tight Sand

Unofficial reports are that the sand section was hard, tight, and difficult to core. Tubing is suspended in well, at top of pay zone. The company announced that some small stringers above the Basal Bromide showed small amounts of oil on drill-stem tests, but nothing considered important, and these were cased off.

Results of two drill-stem tests above the Ordovician pay were given. At 6,018-40 ft. in the Pennsylvanian, a test recovered 90 ft. of gas-cut mud; 1,240 ft. of oil and gas-cut mud. A small amount of oil recovered from the mud, showed it to be heavy, black, but not dead, 22°-gravity oil. A test at 8,545-98 ft. in the Hunton, resulted in recovery of 620 ft. of oil and gas-cut mud, with a small amount of free, high-gravity oil.

Official tops and elevation are: elevation 1,087 ft., top of McLish dolomite, 10,202 ft; Basal Bromide sand 10,060 ft., Simpson (shale) 9,526 ft., Viola 8,903 ft. Sylvan (Sycamore) 8,571 ft., Hunton (probably lower), 8,514 ft., Woodford 8,024 ft., Mississippi Caney 7,630 ft., and Pennsylvanian Springer 6,087 ft.

The well is located on a reflection-seismograph survey made by Seismograph Service Corp., in a block of approximately 8,000 acres held by Sohio. Company officials estimate 90 per cent of productive territory will fall within their block, but interpretation is difficult. Frank H. Willibrand, division manager for Sohio stated, "development in the new area will probably prove it to be a highly complex structure."

Pennsylvania East Texas Gulf Coast Wells Sold

Producing properties in the Pennsylvania, East Texas, and Gulf Coast areas changed hands in three separate transactions disclosed recently.

Stanolind Oil & Gas Co. was reported to have bought four wells in East Texas field from Stewart Oil Co. for $250,000 cash. The wells are located on the C. C. Giles 9-acre lease. Stanolind has been gradually expanding its East Texas holdings for some time.

The purchase by McCarthy Oil & Gas Corp. of a half interest in Jackson Pasture field, Chambers County, Texas, was confirmed in Houston by both the McCarthy and the Gulf companies. The deal included five wells, all gas-distillate producers from about 8,000 ft. Two of the wells are on submerged state leases.

In Smethport, Pa., the firm of Olson, Fenner & Warren sold their holdings of about 700 acres in the Coryville fields to the N. V. V. Franchot Trusts of Olean, N. Y. Twenty-three wells producing approximately 150 bbl. daily were involved.

Maritime Commission Lists 25 Surplus-Tanker Sales

Twenty-five surplus tankers offered for sale by the U. S. Maritime Commission were bought by private companies and foreign governments during November and December, 12 of the group changing their registry to that of a foreign country.

Standard Oil Co. of New Jersey was the biggest purchaser, buying six T2-type tankers. Other domestic buyers included Gulf Oil Corp., two T2 and one T3; Pan American Petroleum & Transport Co., two T2; Sinclair Refining Co., one T3; and National Bulk Carriers, Inc., one T-Special.

Six tankers went to British registry with Imperial Oil Co., Ltd., and Anglo-American Oil Co. each buying three of the T2 type. Three went to Panamanian registry with Overseas Tankship Corp. and Panama Transport Co. each buying one T2 type and Esso Standard Oil Co. purchasing one T1 type. The governments of Norway and the Netherlands each bought one T2 type, and the last went to Venezuelan registry with a purchase of a T1 type by Compania de Petroleo Lago.

Two prewar tankers have been announced for sale on a sealed-bid basis by the commission. They are the 67,000-bbl. Annibal and the 84,000-bbl. Big Horn.

Special Train Planned

HOUSTON.—A special train to the annual convention of the American Association of Petroleum Geologists March 24 in Los Angeles will be sponsored by the Houston Geological Society. Members of other Texas, Louisiana, and Mississippi groups have been invited to join the Houston geologists.

Robert B. Russell to Get Cadman Memorial Award

Robert P. Russell, president of Standard Oil Development Co., will receive the Cadman Memorial Medal for outstanding research in petroleum science, according to an announcement in London by the Institute of Petroleum. Russell will receive the medal June 4 when he delivers the second Cadman Memorial Lecture in London. The medal, first awarded in 1946 to Sir William Fraser, commemorates the services to the petroleum industry of the late Lord Cadman.

Russell recently was awarded the Medal for Merit by President Truman for "especially meritorious conduct in the performance of outstanding services" and also received the 1946 gold medal awarded by the American Institute of Chemists for "noteworthy and outstanding service to the science of chemistry."

CALIFORNIA is a modern bonanza of oil. This area has produced vast stores of petroleum products to supply the needs of the West Coast and Pacific areas. Further wild catting developments in this area will supplement present reserves, to supply the ever increasing demands of the West Coast, which is destined for tremendous post-war expansion, and throughout the Pacific world.

In the past years California's rich fields have been producing large quantities of much needed oil and are exceeded only by the ten combined districts of the state of Texas in past and current production and in proven reserves.

In the past 43 years, representing most of California's oil history, Youngstown has contributed a large share of its drill pipe, casing, tubing and line pipe. The continued trend toward deeper drilling and the problems involved therein indicate a future need for larger quantities of better pipe. To meet those needs, Youngstown can be depended upon to supply the quality and the quantity of tubular goods required, no matter how severe those requirements may be.

Youngstown is identified by the orange band or bands.

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New Firm Buys Continental's Drilling Facilities in California

APPROXIMATELY 100 former employes of Continental Oil Co.'s drilling department have joined a new California drilling contracting firm which has been organized with the purchase of all Continental's California drilling facilities.

The new company, a partnership known as Bell & Burden, was formed by A. H. Bell and Dewey H. Burden. Bell was for 20 years in charge of Continental's drilling and producing operations and has had broad experience in California drilling problems. Burden is president of Owl Truck & Construction Co. and Owl Rock Products Co. and has contracted oil-field construction in California for 25 years.

The sale of Continental's California drilling facilities and the organization of the new firm is a second deal of its kind in recent weeks. A group of about 65 former employes of Union Oil Co. of California bought Union's drilling properties and set up the new Santa Fe Drilling Co. (The Oil and Gas Journal, January 18, page 38).

A. H. BELL

D. H. BURDEN

Continental and Union are reported planning in the future to contract all drilling in California.

Equipment bought by Bell & Burden included five strings of rotary tools, two of which are spark-plug rigs. The firm also took over for completion four wells which were in progress at the time of the sale.

Well Allowables Above 15 Bbl. Held Legal by Kansas Supreme Court

TOPEKA. — Belief that legislation fixing the minimum daily allowable of Kansas oil wells at 25 bbl. will be introduced soon in the state legislature was expressed here this week following a ruling by the state Supreme Court that the Kansas Corporation Commission has the power to set the minimum allowable above 15 bbl. daily.

It was believed by some observers that the commission, in view of the court's ruling, immediately will set the minimum at 25 bbl. Observers cited the commission's opinion issued in September which pointed to the high cost of production in favoring an increased minimum but which declared the commission did not have the authority to raise the allowable.

The Supreme Court last week overruled the commission, holding in a 4-3 decision the commission "has power to amend its rules and regulations so as to fix a minimum allowable in proration pools in excess of 15 bbl. per day."

The original suit was filed by Aylward Production Co., Aladdin Production Co., Solar Oil Co., Stelbar Oil Corp., Atlantic Refining Co., George Reeves, and A. S. Ritchie. They sought to reestablish a 25-bbl. minimum allowable after it was cut to 20 bbl. last spring and to 15 bbl. in September. The 15-bbl. order was set aside by the Barton County court and the minimum allowable has remained at 20 bbl. during the controversy.

The Supreme Court ruled the allowable could be set above 15 bbl. daily "upon substantial competent evidence being presented that such action is necessarily in order to prevent waste or injury to correlative rights of producers or to avoid unreasonable discrimination."

Louisiana Asks Injunction In Gas-Export Dispute

SHREVEPORT.—District Judge Robert J. O'Neal last week denied the State of Louisiana a temporary restraining order to prohibit Placid Oil Co. and others from exporting natural gas from the state via the Little Big Inch pipe line.

The judge scheduled a hearing for January 29 at which the company has been ordered to show cause why an injunction should not be granted.

H. L. Hunt, operator of the company, 2 weeks ago obtained a permit to export 50,000,000 cu. ft. daily. Later Joseph L. McHugh, commissioner of conservation, revoked the order, although an opinion requested from the attorney general ruled that Louisiana had no law authorizing the conservation commissioner to prohibit the export of natural gas. The opinion held that the commissioner "can not withdraw or revoke an allowable once granted because the gas was being exported from the state."

The Hunt interests have indicated production and export of gas will continue until a decision in court is reached, in spite of the permit revocation. The gas is being sold to Tennessee Gas & Transmission Co. for transportation via the Little Big Inch line.

Mid-Continent Inaugurates New Tulsa-Houston Route

Mid-Continent Airlines inaugurates February 1 a new twice-daily flight service between the two Southwest oil centers of Tulsa and Houston.

Scheduled to be aboard the airliner on the initial flight are copies of The Oil and Gas Journal for the convenience of the oil men whom the route is designed principally to serve. Flying time from Tulsa to Houston will be 3 hours and 7 minutes with a stop at Tyler.

Sun Tanker Joins Fleet

PHILADELPHIA.—Sun Oil Co. has received delivery on the last of three tankers recently purchased to restore the company's prewar tanker strength. The "MS Brandywine," an 18,000 dwt. tanker built at Sun Shipbuilding & Dry Dock Co. has been renamed the "MS Atlantic Sun." This brings the Sun tanker fleet to a total of 17 ships representing 249,740 dwt.

WASHINGTON WATCHING

BY HENRY D. RALPH

No Rubber-Stamp Council

WASHINGTON.—"Now I'm sure the National Petroleum Council is here to stay. Until today I had my doubts."

So said a prominent member at the close of last week's meeting which laid out an active, but carefully delineated, program for the next few months.

The reason for this was the firm action of the agenda committee, backed up by the rest of the council, in charting a clear course of committee action within the legal prescriptions previously laid down by the Department of Justice for industry advisory groups.

In short and simple words, the council is going to mind its own business. Its business is to inform the Interior Department of conditions in the oil and gas industries which are affected by activities of the federal Government, period. It will not take over any government functions. It will not arbitrate differences between industry factions or competing branches. It will not become a tool for enlarging government activities, lobby for bigger appropriations, nor cover up government errors. Above all, the council is going to run its own show in its own way.

This is, in effect, a "separation of powers." Industry and Government are going to stay on their respective sides of the fence. During the war the fence was down, but now it's up again. Industry and Government will cooperate but not amalgamate.

By asserting its independence, the NPC assures itself a permanent and forceful role. Like the shoals of Cape Hatteras, the Washington scene is strewn with the wrecks of industry-advisory committees which came to grief because they allowed themselves to be dominated by the government agencies that created them. The inevitable tendency is for the agency to call on its committee only when it needs help to pull some chestnuts out of the fire, to endorse a course of action already decided on, or to apologize for a mistake; adverse criticism is suppressed, and an unsubservient committee meets less and less frequently and finally disintegrates.

The Government's Reaction

INTERIOR DEPARTMENT officials profess to be well pleased with the action of the National Petroleum Council, even though it was critical of some of their actions and turned down a number of their requests.

For the most part these expressions of satisfaction are genuine. The Bureau of Land Management, for example, may be a bit chagrinned at the severe panning the council gave certain provisions of its new leasing regulations, but the officials must admit that the leasing committee's report was frank and forthright and its criticism constructive rather than destructive. The Bureau of Mines and the Geological Survey doubtless would have welcomed pledges to lobby for bigger appropriations for their projects to build more synthetic-fuel plants and explore the entire Continental Shelf. The Oil and Gas Division didn't get full support for all of its statistical proposals.

But there was no criticism of the spirit and the logic behind the council's actions. The spirit was that of "friendly enemies," and the logic was that by retaining its independence and remaining in its proper sphere of activity the council will always be in position to speak for the industry rather than for the Government.

In virtually every case where the council declined to go along with some action or request of the Government, it offered constructive suggestions or pointed to alternative means.

For example, on conservation of flare gas, NPC politely reminded the federal Government that this is none of its business, but if it wants to help with the problem it can lend support to the states and the Interstate Oil Compact Commission. Likewise on statistics; NPC declined to collect new ones or say which government agency should do the job, but agreed to advise on the value of statistics to the industry.

Superficially, the council's refusal to accept so many of the Government's requests may look like refusal to cooperate. But by suggesting alternate approaches to each problem the council fulfills its function of keeping Government and industry each in its proper sphere.

Clayton's Statement

THE State Department's unequivocal statement that the pending Anglo-American petroleum treaty means only what it says and not what some have read into it has cleared the atmosphere so far as the Board of Directors of the American Petroleum Institute is concerned.

At its Washington meeting January 22 the board received a letter from W. L. Clayton, undersecretary for economic affairs, in answer to the A.P.I. resolution requesting clarification of the treaty's terms. All but one or two of the directors professed to be fully satisfied with the letter and to be ready to support ratification. Way under the far corner of the bed some may still see a suspicious shadow in the form of a fear that sometime in the future the State Department may propose things it says are not in the present treaty.

At its Chicago convention the A.P.I. adopted a resolution pointing out that certain State Department officials have interpreted the treaty as opening the door to international control of the world's oil industry. Clayton's letter made no reference to this, but since his is a formal statement by a top policy official it may be assumed that it amounts to a repudiation of the expressions of lesser department employes.

Oil's Portal Pay Problem

THE "portal-to-portal" pay question in the oil industry has been recognized by existing wage contracts, and suits which have been filed for additional compensation are without merit, according to a brief filed for the industry with the Senate committee on the judiciary.

The brief was submitted jointly by the Mid-Continent Oil and Gas Association, Independent Petroleum Association of America, and American Petroleum Institute. No testimony nor oral argument was given because the committee is completing lengthy hearings on the effects of portal pay suits on all industries and is perfecting the draft of legislation to outlaw or restrict them. While echoing the complaints of most industries that retroactive wage claims running into the millions of dollars would bankrupt many companies in the oil business, the brief was confined chiefly to a discussion of conditions peculiar to the oil industry.

"The nature of the petroleum industry from production through to final distribution is such as to cause many of our operations to be located in isolated areas," the brief explains.

"This problem has been recognized and compensated for in the primary contract of employment and rates of pay. These rates of pay are generally contained in contracts, most of which were arrived at through collective bargaining. To further subject the in-

dustry to unexpected and uncontemplated compensation in the nature of payment for the nonproductive periods the employe uses to reach his place of productive employment would disastrously affect the entire economy of this industry.

"Many of these contracts contain clauses establishing a procedure for handling grievances related to rates of pay and other working conditions covered by the contracts. In numerous instances the grievance procedure led directly to arbitration. In no instance to our best information have these clauses been invoked in an attempt to settle these demands. It can be inferred from this that the collective-bargaining representatives believed as we do that there was no basis for 'portal-to-portal' claims and that the rate paid for the job included the incidentals such as are now claimed as a result of the Mt. Clemens decision.

"Surely the employes of these companies and their representatives are not being damaged if their claims are refused. They were paid for all productive time and were apparently satisfied. Now they are asking for more, not in the future alone but also for the past.

"In asking the committee to pass some legislation of the type that they are now considering, let it be understood that we are not asking that they be hereafter barred from obtaining pay for walking time, travel time, or anything else that may constitute wages, hours or conditions of employment. Labor will still be free to bargain collectively for compensation for such time even if this legislation is passed."

An Unnecessary Committee?

THE report of the Senate petroleum-resources committee is due to be filed January 31, and outgoing chairman Joseph C. O'Mahoney of Wyoming promises to make the deadline with a concise and readable resume of the hearings spread over the past 2 years and recommendations forming the basis for a national oil policy.

Filing of the report will raise the question of continuing this special committee, and Sen. E. H. Moore of Oklahoma, who would be chairman if the committee is revived, has authored a resolution for this purpose. The congressional reorganization act passed last year was popularly thought to have abolished all special committees and require investigations to be conducted by the regular, standing committees of House and Senate. But in the past week the Republican majority has successfully argued that this is a misapprehension, and won narrow votes for continuing the war-investigating and small-business committees in the Senate.

So the door would seem to be open for reviving a special petroleum committee, particularly if the industry should rally to Moore's support by claiming that it needs a special godfather. However, the oil industry has always fared rather well in the House without a special petroleum committee. A standing subcommittee of the House committee on interstate and foreign commerce has more or less paralleled the work of the Senate's special committee, and its reports have carried quite as much prestige.

Army's Tank-Car Program

THE shortage of pressure tank cars for the liquefied-petroleum-gas industry may soon come to the attention of Congress through investigations of the fertilizer program. Both the House committee on agriculture and the Senate committee on expenditures in the executive departments have appointed subcommittees to investigate the Army's fertilizer program and its effect on the domestic industry.

These investigations were started primarily by complaints of farmers that their fertilizer supplies are endangered by the Army's program of shipping large quantities of plant food to occupied areas of Europe and Asia as a means of reducing occupation costs and food shortages. However, it is unlikely that either group will get far before running into the fact that the Army has grabbed off for anhydrous ammonia a large number of pressure cars designed and needed for L.P.G. shipments, with the result that many L.P.G. customers are without fuel.

The board of directors of the American Petroleum Institute last week adopted a resolution asking the Government to reexamine the fertilizer program and provide protection for domestic needs, pointing out that since most of the new fertilizer could not reach its destinations in time for the current planting season the program should be relaxed to permit pressure cars to remain in L.P.G. service a few more months.

Meanwhile the Office of Defense Transportation has ordered the oil industry to surrender 190 ordinary, nonpressure, tank cars to chemical companies taking part in the Army's fertilizer program. These will be used, after slight modifications, for transporting ammonium nitrate. The Army had planned to call in 318 government-owned sulfuric acid tank cars now on lease to various chemical companies, but it was discovered that shortage of acid tank cars would disrupt not only other phases of the fertilizer program but other industries as well.

The 190 cars requisitioned from the oil industry are all of Class ICC 103 or ARA 3, and have a total capacity of 1,425,000 gal. Each of the companies called on is said to own at least 1,000 cars of this type. The requisitions are: Union Tank Car Co., 68; General American Transportation Co., 67; Shippers Car Line, 17; Sinclair Refining Co., 11; North American Car Corp., 8; Shell Oil Co., Inc., 4; Mid-Continent Petroleum Corp., 4; Mexican Petroleum Co., 3; Gulf Oil Corp., 3; Tide Water Associated Oil Co., 3; and Cities Service Oil Co., 2.

New Aviation-Gasoline Tax

A NEW federal tax on aviation gasoline is one of the proposals under discussion as a means of financing the heavy outlays to which the Government seems committed to improve the safety of air travel.

Figures mentioned are 4 or 5 cents per gallon, compared with the present federal tax of 1½ cents per gallon on motor gasoline. Other possible revenue sources would be a license fee for each plane, graduated according to freight and passenger capacity, and a gross earnings tax on commercial airlines. While airport construction, landing aids, weather service, and communications would be paid out of the general treasury, it is hoped to obtain some special revenues from the beneficiaries, just as motor fuel taxes are supposed to more or less offset expenditures for highway improvements.

West Texas Gas Producers Told to Follow Schedules

West Texas gas producers who have connections to gasoline plants must produce their wells in accordance with producing schedules issued by the plants under a new conservation order promulgated by the Texas Railroad Commission.

The order affects operators in Seminole, Goldsmith, and North Cowden fields. Other measures are expected to follow in the future as the Texas regulatory body seeks to increase its control in order to reduce waste of the state's gas reserves.

The commission also has ordered that loads to the processing plants be distributed throughout the day, since it discovered that the practice of delivering peak loads during daylight hours had been forcing plant operators to flare much of the gas.

J. & L. Letter Widely Read

A Christmas letter circulated by Jones & Laughlin Supply Co., Tulsa, has been featured in the company's national advertising. Emphasizing "work and the good earth" as the means of obtaining peace and prosperity in the nation, the letter (The Oil and Gas Journal, January 25, page 37) points out that man "lives and survives only as he draws the good things from the good earth by his own labor."

Markets Troubled by Continued Shortage of Tank Cars

AN acute shortage of tank cars of all types, aggravated by slow railroad turn-around time, continues to hamper efforts of suppliers of petroleum products to meet peak winter demand for burning oils in the midwestern marketing territory.

The almost universal complaint of suppliers concerned the insufficiency of tank cars. Shipments were booked "subject to delay," and some refiners were reported to be hundreds of cars behind.

In some marketing deals, slight price concessions were offered if tank cars were furnished. The shortage of rail transportation also was reflected in an extremely heavy demand for pipe-line gasoline.

Several marketing officials declared railroad service is extremely poor and said delivery time north of Chicago is particularly slow. "Getting through that Chicago terminal seems the worst yet," one sales representative commented. Another Mid-Continent marketing official said cars for heavy fuel oil are especially short, apparently because refiners have not had time to convert cars back from light fuel-oil service for which many were used prior to January 1 when higher freight rates became effective. Jobbers were said to be ordering heavily in an effort to keep ahead on storage because of the uncertain time of tank-car deliveries.

One ironic note to the over-all rail-shipment shortage was a report from New York that many large coal users are being forced to switch to oil use due to a coal-car shortage. Most East Coast fuel oil moves in by tanker. Residual fuel oil prices were firm, and demand heavy in New York.

Midwest Prices Firm

Prices throughout the Midwest remained generally firm. Movement of burning oil continued at a high level, and gasoline demand was heavy for the season. One major supplier of natural gasoline posted a ⅛-cent higher price, quoting 4⅝ cents North Texas and 5⅛ cents Oklahoma.

The lagging market in light burning oils on the East Coast improved slightly as a result of colder weather. Prices were firm at the new low levels. Socony-Vacuum Oil Co., Inc., lowered its No. 2 price 0.2 cent through most of New York state and New England, following an earlier reduction in New York itself.

The slow East Coast market affected the Gulf Coast where little burning-oil movement was reported. No. 2 prices there ranged around 4¾ cents. Gulf Coast gasoline was said to be fairly tight with an active export demand for regular grade.

In California, Standard Oil Co. of California announced an increase of ½ cent in gasoline and kerosene, and ¼ cent in diesel and heating oils. The company said the higher prices partially cover higher costs of doing business.

Emphasizing the generally tight U. S. crude market, refiners in Saskatchewan Province in Canada were reported to be offering premiums ranging up to 20 cents per barrel for Northern Montana crude. Buyers also have been scouting Wyoming fields, and some are reported seeking contracts as far south as Rangely in western Colorado.

The bulletin of the National Association of Purchasing Agents, commenting on the over-all situation in fuel oil, said the distillate and heating-oil market is "running true to form" while residual supply continues tight. Distillate and heating oil inventories, the bulletin noted, are dropping except along the Northeastern Seaboard "where the weather has been unusually mild and stocks were maintained at high levels in anticipation of labor troubles."

Searle Acquires 800-Bbl. Refinery at Salem, Neb.

An increase of 800 bbl. daily in its refining capacity has been made by Searle Petroleum Co., Omaha, Neb., with the purchase of the Salem, Neb., refinery of Oil Marketing & Refining Co., Inc.

H. A. Searle, Jr., president, said the Omaha company also acquired 17,000 bbl. of crude oil and some tank cars in the deal.

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1946 is now in preparation and will soon be ready. Due to the continued shortage of paper, it will not be published in a regular issue. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

DEATHS

William C. Josey, 77, independent oil operator, died January 22 in Dallas. Josey was head of two Texas independent companies, Rancho Oil Co. and Gem Oil Co.

Otis H. Kyle, 49, operator at United Gas Corp.'s Koran gasoline plant, in the Shreveport, La., district, died December 15.

Patrick A. Hardman, 84, retired drilling contractor, died January 24 at his home in Tulsa.

Charles F. Kolp, 70, independent oil producer, died January 20 in Electra, Tex., of a heart attack. A native of Harrisburg, Pa., Kolp came to Texas in the early 1880's. He was the first superintendent of the Waggoner refinery at Electra.

Perry S. Vanderlin, Bradford, Pa., drilling contractor, died January 22 in a Bradford hospital.

John A. Messer, 55, who organized and served as vice president and general manager of Messer Oil Corp., died January 21 in a hospital in Olean, N. Y. During 42 years in the oil business, Messer served as president of McKean Natural Gas Co. and a vice president and director of Belmont Quadrangle Drilling Co., in Bradford.

Charles A. Culter, mining man and geologist of Idaho Springs, Colo., died in that city recently. He did oil-field work in Texas and Mexico and later as president of Platte Valley Petroleum Co., Orchard, Colo., located the discovery well in Greasewood field in Weld County, Colorado.

Albert H. Mayland, 72, prominent in Turner Valley oil development, died recently in Calgary. In 1928 he organized Mayland Oil Co. and in 1934 Gas & Oil Products.

John Tancred, Jr., 45, sales promotion manager of Jarecki Manufacturing Co., Houston, died January 20 in a Clarendon, Tex., hospital of injuries received in an automobile accident near Clarendon. Tancred was discharged from the Army in January of 1946 with the rank of major. He participated in three invasions in the South Pacific.

Wilson Cross, 74, former chairman of Vacuum Oil Co., Ltd., London, died January 24 in Pasadena, Calif. He was a past president of the American Society in London and the American Chamber of Commerce.

Fig. 1—(Top) Coating drill-pipe sections in the experimental laboratory of Spang-Chalfant Division, National Supply Co. at Ambridge, Pa. Joints, upended on gasket seals, were filled with plastic and allowed to drain slowly for a uniform coating

Fig. 2—(Above) After each plastic application, pipe sections were air dried, then baked in the oven shown at the left. This experimental coating laboratory has since been replaced by full-scale operations in a permanent coating plant at the mill. Insert shows inside surfaces of pipe as received and after dipping and baking two prime coats and two finish coats

COATED DRILL PIPE

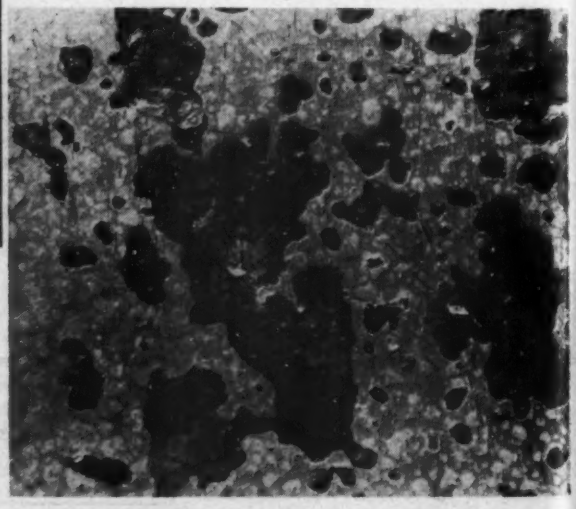
proves successful in Permian basin

by George Weber

PLASTIC-COATED drill pipe has been employed in rigorous field use, drilling corrosive salt sections of the Permian basin for the past 14 months. As a result of its success in what is considered to be the most troublesome major drilling area in this country, a new product now emerges from the experimental stage, offering a partial but practical solution to the major problem of drill-pipe failures in highly corrosive areas.

Plastic coating, now widely used to protect metal surfaces from corrosive action, is possible only on the interior surface of drill pipe. No known plastic will resist the abrasion and shock applied to the outside of such pipe in service. However, such an external coating would add little further protection from

Fig. 3—(Below) Magnification (X5) of the calcareous deposit which formed over the plastic coat of drill pipe after service in the Permian basin. This gives the inside surface of the pipe a mottled appearance which indicates plastic failure on visual inspection



corrosion, since the same abrasive action which makes such a coating impractical, also retards formation of corrosion pits by wiping them off the minute they get started. Therefore, a stable well-bonded internal plastic film, resistant to water, oil, mild caustic and other chemicals, and normal mud abrasion at temperatures up to 400° F. will provide sufficient protection to warrant the additional cost.

A coated pipe which appears to fill these requirements was recently announced by Spang-Chalfant Division, National Supply Co. A result of several years of research and experiment, the new pipe has seen continuous use in West Texas and New Mexico since November 1945.

Early Experimental Work

The company's interest in coated drill pipe dates from 1939. At that time drilling in the corrosive Bemis pool of western Kansas resulted in such a high rate of drill-pipe failures that a protective coating was suggested as a possible control measure. Laboratory work was begun and in 1941 two experimental strings of drill pipe were placed in the field. They comprised alternating lengths of regular uncoated pipe and lengths coated with an air-dried phenolic plastic, and were field tested in "hot spots" by Magnolia Petroleum Co. and Parker Drilling Co.

Although the coating failed to stand up under prolonged service, scaling and wearing away gradually from the inside surface, it did afford some protection. One string suffered 21 failures during service, 20 of which occurred in uncoated lengths and 1 in a coated section. The latter failure was attributed to fatigue from overstressing.

The company then turned to thermosetting plastics and developed an improved method of application, producing four more experimental strings for field testing in 1945. The reverse-dipping method was used, employing a Bakelite plastic. Lengths of 4½-in., 16.6-lb. Grade D pipe were first shot blasted to remove all scale. After a borescoping inspection, each length was upended on a gasket seat and liquid plastic was forced upward into the pipe, filling it to the top. (Fig. 1). A uniform coating free of air bells and streaks was obtained by draining the plastic slowly from the pipe section. The film adhering to the inside surface was then dried at normal air temperature, and baked in a horizontal furnace. (Fig. 2, at left). The plastic is yellow as applied, baking to a deep maroon with a high glossy finish. Four coats, two prime and two finish, are so applied reversing the joint each time. This laboratory procedure has now been replaced on full scale with a permanent coating plant at the company's mill in Ambridge, Pa.

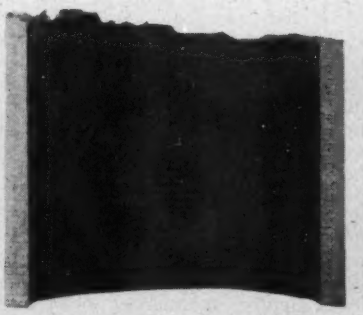
Field Testing

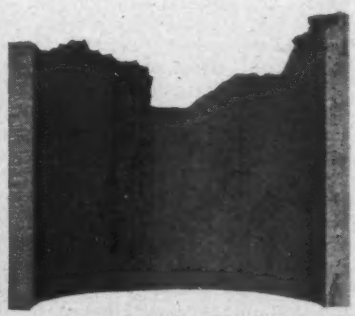
The strings of new mixed coated and uncoated pipe were shipped to four selected companies in October 1945. One string has not yet been placed in use, but the remaining three have drilled an aggregate of over 78,000 ft. of hole in the Permian basin without a drill-pipe failure due to inside corrosion of any coated length.

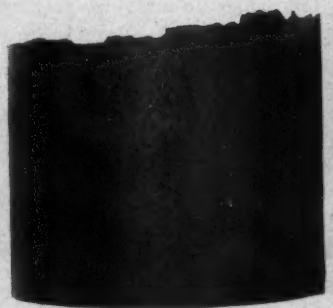
With one string, Hawkins & Roberts, drilling contractors, drilled a 9,181-ft. well in the Block 31 field of Crane County, Texas. During this operation no failures occurred in either coated or uncoated pipe. The string was then broken up and included in two other strings of uncoated pipe. One is now drilling below 6,000 ft. in an Atascosa County wildcat south of San Antonio, a noncorrosive area, and the other is drilling below 8,800 ft. in a TXL field well in Ector County. Reports to date show no failures in coated joints in either string.

With a second string of alternating lengths of coated and uncoated pipe, another drilling contractor, Thompson & Carr, drilled four TXL wells and

(Continued on page 49)







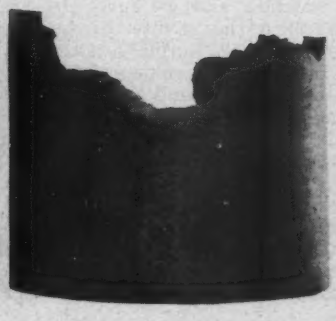


Fig. 4—(Below, left) The same surface shown in Fig. 3 as it appears after cleaning with acid. Coating was found intact under the lime deposit

Fig. 5—(Below, right) Inside and outside surfaces of a section of uncoated drill pipe which failed in service due to fatigue arising from internal corrosion pits. Coated and uncoated samples shown in Figs. 4 and 5 were taken from the same mixed string which drilled 29,000 ft. in West Texas and New Mexico

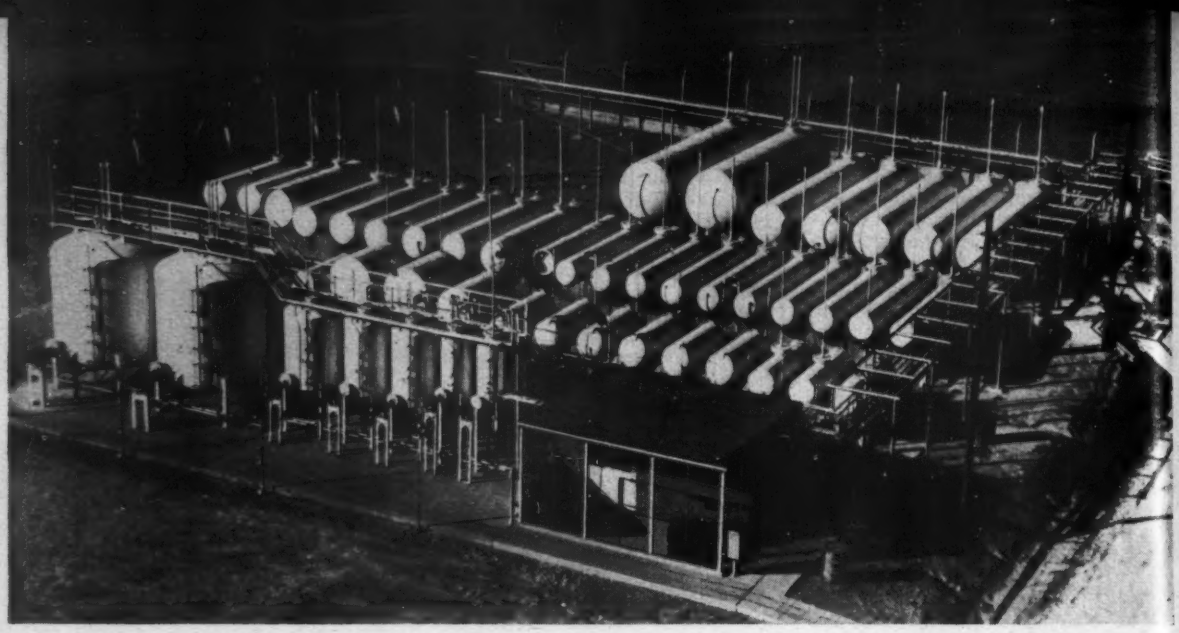


Fig. 1—A pure-hydrocarbon storage system

Development and Maintenance of Pure HYDROCARBON STANDARDS

by R. C. Alden and J. W. Tooke

TRADITIONALLY a standard is an unchanging object, locked away in a safe place, and used occasionally for reference. In such a place it is protected from temperature and humidity changes, chemical action of the atmosphere, and general deterioration. Hydrocarbon standards, however, often must be consumed to be effective and this fact presents an uncommon variety of conditions that must be fulfilled in order to assure absolute uniformity. Ideally a hydrocarbon standard would be 100 per cent pure with absolutely no contamination. Since this ideal is obviously never attained the next best thing is as pure a standard as can possibly be prepared together with knowledge of and controls on the amount and nature of the contaminating substances.

A long accepted use of a hydrocarbon standard may be found in the antiknock testing of internal-combustion-engine fuels. Normal heptane and 2,2,4-trimethyl pentane are defined as the zero and 100 unit points on the octane-number scale. Any contaminating substances in these materials will shift these points to a degree determined by the amount and nature of the contaminant. Likewise a large number of individual hydrocarbons are used as standards for calibrating spectrographs and other instruments. Contaminants in these standards alter the spectra which in turn shifts the calibration of the instrument.

Since standards of this nature are never perfect it is desirable to strive for as pure a grade as possible, setting forth carefully and vigorously, first, the amount of total impurity that may be tolerated and, second, the chemical and physical attributes of the impurity. Several means are available for arriving at exact values for the first of these variables. As for the second variable, since little actual control can be exerted to change or modify the impurity, it is necessary to strive for uniformity of the impurity so that its effect is both constant and small.

This may be accomplished by limiting the source of the standard and rigidly maintaining only one batch of a standard at a time so that these variables do not fluctuate from sample to sample. A good example of what may be encountered is found with normal heptane. This compound may be derived from the Jeffrey pine tree, or by synthesis from other chemicals, or by careful purification from petroleum. Although it may be highly purified from any one of these three sources, there is little doubt but that the small amount of impurities it does contain will vary widely with the source and will therefore shift the octane-number zero point in varying degrees even if the small mol fraction of impurity is maintained constant. Situations such as this emphasize the necessity of deriving standards from a single source material and maintaining those standards for each individual batch.

The importance of maintaining only one batch and one source of hydrocarbon standard at a time cannot be overemphasized. As will be pointed out later the purely physical factors of handling the material can lead to differences between samples over and above those differences caused by dissimilar source materials and other methods of manufacture. These differences though small may lead to questionable results in which case the standard loses much of its usefulness as the problem has degenerated into comparing standard versus standard rather than sample versus standard.

With this concept of a hydrocarbon standard established other purely physical factors affect its usefulness. As was previously pointed out these standards often must be consumed to be of value. This means that once they have been obtained they must be stored, placed in containers, and transported. Ordinarily these operations are common enough and little thought is usually attached to them. Each, however, presents at least one

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J. W. Tooke joined Phillips in 1935, and in 1940 was made section chief of the manufacturing section of the research laboratory, in which capacity he has been closely associated with the development of pure hydrocarbons. He received his formal education at Louisiana State University, and was employed as a chemist in plants producing chemicals from oilfield brines for 5 years.

opportunity to change the sample in some way and in so doing voids it as a standard. Meticulous care is necessary in these operations to assure the ultimate user that his standard is uniform and representative of the original. This is particularly difficult in instances where standards are used in large volumes. Usually they are manufactured and shipped in volumes ranging from a few milliliters to several gallons. Because operation on this small scale is essentially an extension of laboratory methods, little difficulty has been experienced in maintaining standards of purity. The National Bureau of Standards and the American Petroleum Institute have cooperated in the preparation and purification of 99 hydrocarbons. These materials have been put in 5, 8, and 25-ml. vials and are available to those who have need for high-purity, small-quantity samples for standardization of instruments and for research on physical properties and chemical reactions.

Three papers on the purification of these compounds were presented at the 110th meeting of the American Chemical Society.[1,2,3] At Ohio State University, the A.P.I. Research Project 45 has prepared a large number of hydrocarbons for antiknock testing. The procedures by which these materials were prepared have been reported by Gibson, Boord, et al.[4] Industry has also prepared a large number of hydrocarbon standards.[10] Several hydrocarbons have been and are being produced and consumed in large quantities in a state of high purity, examples of which are the recent preparation of normal heptane and 2,2,4-trimethyl pentane in purities greater than 99 mol per cent and in quantities sufficient for drum and tank-car deliveries to those requiring these materials. Also toluene is extracted or synthesized from petroleum for explosives, and butadiene is prepared for synthetic rubber. Isopentane, benzene, cumene, and other hydrocarbons have also been prepared but in lesser quantities than toluene and butadiene. The storage, transfer, shipping, and testing of these materials to maintain purity once they have been prepared require special techniques. It is the purpose of this paper to discuss these techniques.

This problem is all the more important when it is realized that as little as 0.2 or 0.3 per cent contamination may produce a product which does not meet specifications. For example, 2,2,4-trimethyl pentane is now produced with a purity of 99.75 mol per cent. If this material is to be used as a primary reference fuel it must also have an octane number between 99.9 and 100.1. Should the product be handled through conventional refining systems it might very easily pick up sufficient contamination to significantly change its octane number and yet retain a high purity. According to Doss[5] normal octane has a blending octane number of —19. Assuming the 2,2,4-trimethyl pentane had an initial octane number of 100, only 0.1 per cent of this contaminant would be sufficient to reduce the octane number below the specification. Similarly 0.2 per cent contamination by normal heptane is more than sufficient to render the product useless. Very much lower concentrations of sulfur or halogen or oxygen compounds would be deleterious. To illustrate this point Table 1 shows the effect of sulfur, chlorine and oxygen compounds on the octane number of three materials.

Two major routes are open for the preparation of pure hydrocarbons. The first is by extraction from naturally occurring mixtures and the second is by synthesis. Extraction from naturally occurring mixtures is usually accomplished by fractionation alone or fractionation plus an adjunct. For some of the lower-molecular-weight hydrocarbons as little as 50 to 100 trays are sufficient for almost perfect purification. In general the higher the molecular weight the more complex the separation and in some cases as many as 300 to 350 trays have been used. Where fractionation alone will not suffice, because an impurity boils

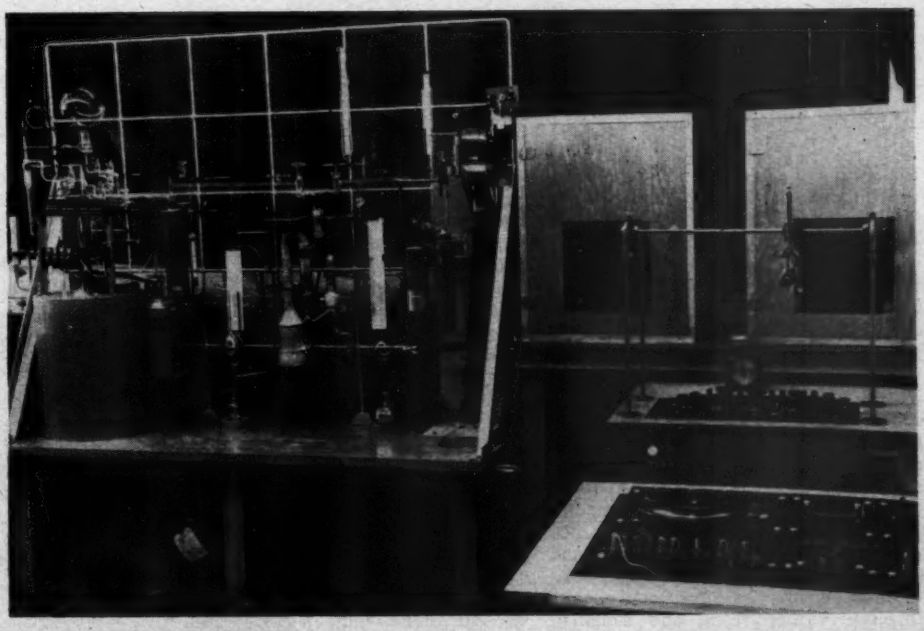


Fig. 2—Calorimetric melting-point apparatus, and a freezing-point apparatus

TABLE 1—EFFECT OF SULFUR, CHLORINE AND OXYGEN COMPOUNDS ON THE OCTANE NUMBER OF THREE MATERIALS

Pure material		Pure material plus impurity as listed	
Material	Oct. No., M.M.	Impurity	Oct. No., M.M.
1. 2,3-dimethyl butane	94.2	0.083% peroxides calculated as H_2O_2	93.0
2. Natural gasoline	50.8	0.044% methyl mercaptan	49.8
		0.050% methyl disulfide	49.9
3. C.F.R. Reference Fuel C-12	78.6	0.0836% tert-butyl chloride	79.6

extremely close to the desired compound or because azeotropes or constant-boiling mixtures are formed, supplementary processes such as extractive distillation, azeotropic distillation, or even fractional crystallization may be employed. In large-scale synthesis of hydrocarbons few, if any, processes are specific. The severity of reaction conditions usually produces side reactions to form compounds which prevent the easy purification of the main product. For some uses this is not undesirable as the impurities simply act as diluents and their only effect is to increase the volume load on a process. For other uses, however, these impurities may actually act as inhibitors or produce undesired byproducts.

Storage Systems

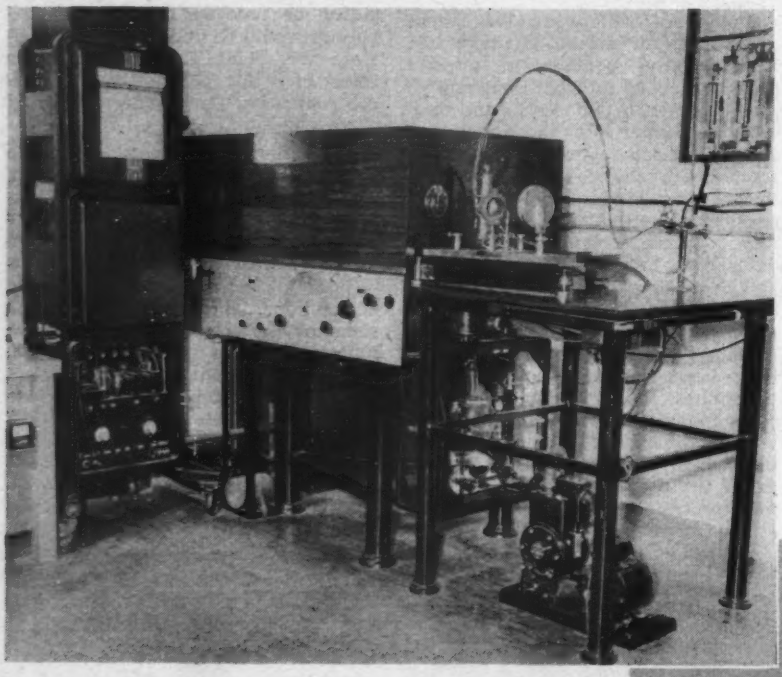
The manufacturing details involved in the preparation of high purity hydrocarbons will not be discussed here; however, subsequent testing, storage, and handling are of vital importance since most materials are stored for a period of months or even years before they are finally exhausted. Once purification has been achieved most scrupulous handling is necessary. Contamination may occur from leaks through valves from one tank to another, through pumping the product into an unclean tank that contains residues from its previous contents or by picking up heavy materials used as lubricants in valves and pumps. In storage some products must be protected from air oxidation by covering with inert gas blankets.

Experience has shown that it is never wise to manufacture directly into permanent storage. Instead, one or more intermediate make tanks should be provided which are from one-tenth to one-twentieth the volume or less of the permanent storage tank. To avoid placing any material which does not meet specifications in the final product, it should be manufactured into one of these make tanks. When a make tank contains a suitable volume, the stream is switched to a second make tank in order to provide sufficient time for analyzing the contents of the first. Usually these analyses are time consuming and may require from 1 to 3 days for completion. If the analysis of the first tank is satisfactory its contents are transferred to permanent storage and the tank is then ready to receive product while the material in the second tank is being analyzed. If in any instance the product is unsatisfactory it is run back for repurification. This procedure is somewhat unwieldy but it prevents contamination of main storage by stocks produced during adverse periods in the manufacturing or purification steps.

All lines carrying pure hydrocarbons must be direct lines and not be used in different services. If at all possible, the lines should be free draining to prevent trapping of material in low spots. The lines from the several make tanks should join just upstream of the suction of the pump whose sole duty is to transfer product from the make tanks to permanent storage.

In addition to the usual safety features embodied in storage tanks the permanent storage should have only three lines directly connected to it. These should be the inlet, the outlet, and the drain line. These should be provided with valves adjacent to the tank and flanged spools adjacent to the valves. This arrangement permits the removal of the spools and blind flanging and sealing of all openings during periods of static storage. In this way unauthorized openings may be detected and records of authorized openings maintained.

The final product is made up of a number of increments which may



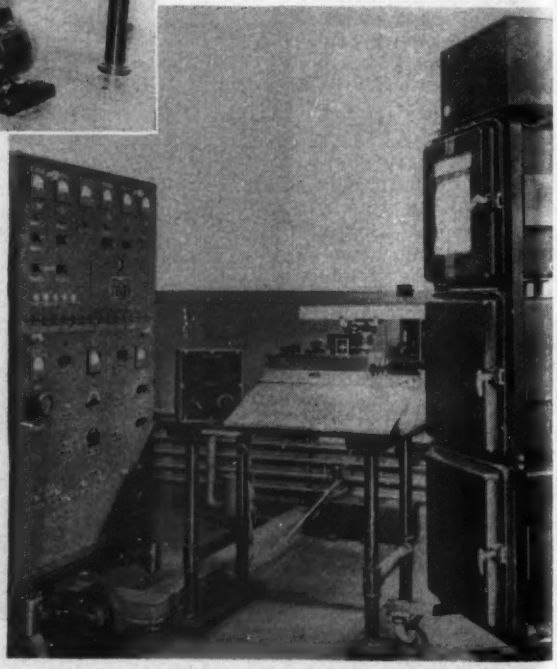


Fig. 3—(Above) A research-type infrared spectrograph. Fig. 4—(Right) A Westinghouse infrared spectrograph

vary somewhat in quality. To assure absolute uniformity of the finished batch the permanent storage tank must be provided with means for thoroughly mixing the contents. This, conveniently, is a side-entering agitator of conventional design similar to those usually found in ethylizing plants. This eliminates any possibility of stratification of the various increments.

The product in a tank so arranged is now ready for final testing and certification with complete assurance of uniformity and freedom from possible contamination. Fig. 1 shows an installation for pure hydrocarbon storage. Methods of testing will be discussed in a later section.

Shipping Containers and Loading Procedure

The permanent storage tank should be located or fabricated in a manner that will permit loading containers or cars by gravity flow. This arrangement eliminates a pump and a possible source of grease or other foreign material. Each product and tank should have its own individual line to a housed loading rack. If automatic loading devices are used there should be provided individual installations for each product. Rubber hose should be avoided because of possible solution of small quantities of rubber or preferential solution of rubber compounding ingredients, especially sulfur. Flexible metal hose has been found entirely satisfactory.

The shipping containers for transporting pure hydrocarbons should all be new. Even so, each container should be thoroughly inspected before use to be certain that it does not contain traces of grease or other foreign material accumulated during fabrication. It is known that certain acid fluxes used in container fabrication accelerate polymer and oxygen-bearing compound formation in some unsaturated hydrocarbons. The most desirable containers are glass bottles. Interstate Commerce Commission regulations, however, limit the volume of these containers to 1 gal. for most hydrocarbons. Larger containers are usually galvanized steel or lacquer-coated steel. The latter container, though not as desirable as galvanized steel, preserves a bright surface and in practice has been found satisfactory.

Each container should be rinsed several times with the product it is to hold, dried, and reinspected before final filling. Especially designed lights are available for inspecting the interior of containers. The most suitable gasketing material is metal foil for screw caps and plain asbestos for bungs. Other materials such as synthetic rubber and resinous products should be used with care though little trouble has ever been traceable directly to them. Finally, each container when filled should be sealed with some device which must be destroyed before it can be opened. This is particularly important since some uses require sealed containers of products. Frequently in referee tests for octane number, sealed cans of reference fuel are called for to help assure undisputed results. The packaged batches of standard hydrocarbons should be regulated so that each package is consumed in a reasonable length of time. This will vary according to the stability of the product. Very active materials such as butadiene and isoprene should not be stored longer than 30 days while on the other hand stable materials like some paraffins may safely be kept from 12 to 18 months or longer. To lengthen the storage period for active materials it may be desirable to add small amounts of oxidation or polymerization inhibitors, or to cover the product with an inert gas blanket or to maintain it in storage at a reduced temperature. Both the main storage and the packaged storage should receive regular periodic inspection to determine that it is being maintained under proper conditions and samples should be regularly withdrawn and retested to assure that change has not taken place.

Testing Methods

Conventional testing methods for petroleum products are not adequate for testing of high-purity hydrocarbons. These materials require special techniques to assure proper results. Usually an estimate of purity is obtained by comparison of very precise physical measurements with published data. This method, however, is not to be desired as it depends upon comparing an unknown with another material which all too often is not defined in terms of absolute purity. Recently spectrometric methods have been developed to a fine point. These methods are useful especially for identification of impurities but are still dependent upon a previously prepared standard of the same material whose absolute purity must be known for accurate work. The one available method by which purity may be arrived at without reference to previous work is through the careful determination of freezing or melting points. This method, however, is also limited in scope inasmuch as it does not identify impurities. For the most accurate results a combination of test methods must be used to arrive at a complete quality appraisal. Several of these methods will be discussed in the following paragraphs.

Probably the most refined melting point determinations are made in precision calorimeters by the Nernst[6] technique. A somewhat less precise but a faster method has been described by Aston et al.[7] These methods have the great advantage that the only previous information needed on a sample is its molecular weight. Also the little-known phenomenon of solid solutions in hydrocarbon systems may be recognized. With the use of newly designed apparatus, all data including melting point of the sample, melting point of the pure material, heat of fusion, heat capacity, and purity of the sample may be obtained in as little as 4 to 8 hours. Mair, Glasgow, and Rossini[8] have described a freezing-point apparatus and method based on a time-temperature freezing curve. This method is rapid and accurate. It does, however, require a prior knowledge of the freezing characteristics of the compound being tested. Tests may be completed in from 2 to 4 hours. This method is in wide use and has proved very satisfactory in most cases. The weakness in all freezing or melting-point methods lies in their inability to determine the nature of the impurity. The results obtained simply give total impurity regardless of whether there are one or several compounds present as impurity. These methods are not applicable in mixtures which form solid solutions unless the phase diagram of the system is known. Because this phenomenon has been infrequently observed little has been reported on it. Tooke and Aston[9] reported the existence of six binary hydrocarbon systems which exhibit this effect. It is safe to say that many more systems will be found that form solid solutions. Fig. 2 pictures both a calorimeter melting-point apparatus and a freezing-point apparatus.

Infrared spectrometry has been successfully used in analyzing a number of hydrocarbon mixtures. In general this apparatus is limited to mixtures of four to six components though in some cases it may be used to analyze mixtures of greater complexity. With respect to pure hydrocarbons in the range of 99 mol per cent pure or better its accuracy is of the order of ± 0.3 mol per cent. If the principal impurities have strong absorption bands removed from the main bands of the chief component this accuracy may be improved. The advantages of this type of analysis are that it is rapid, the sample is not contaminated, and the identity and amount of each impurity may be determined provided the absorption bands are clear of the principal component bands. An infrared research instrument is shown in Fig. 3.

The mass spectrometer is now being manufactured by at least two firms and these instruments are in rather widespread use. They are capable of handling hydrocarbon mixtures of greater complexity than is the infrared spectrograph but are limited in that compounds of nearly the same molecular structure are not easily distinguished. Mixtures containing components of different mass are

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readily analyzed with about the same degree of accuracy as that obtained with the infrared instrument. Fig. 4 shows a photograph of a Westinghouse mass spectrometer.

In determining physical properties of hydrocarbons such as density, refractive index, and boiling point for comparison with the properties of the pure substance probably the most critical item is the accurate measurement and control of temperature. For measuring temperature the platinum resistance thermometer has been found most suitable. This instrument measures temperatures accurately to 0.01° C. and with some uncertainty to 0.001° C. For controlling temperature, water baths with automatic adjustments are available which are satisfactory for supplying large quantities of nearly constant temperature water.

It can readily be seen that there is no one route for arriving at a value for absolute purity. Rather one must select a set of methods most suitable to the compound. The values obtained by this set of methods should agree reasonably well before a final value for purity of the compound is assigned.

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Coated Drill Pipe

(Continued from page 41)

one test in southeast New Mexico. Footage in these four wells totaled 29,257 ft. During this service, of 11 drill-pipe failures, 8 occurred in uncoated lengths, due to inside corrosion and other causes and 3 coated lengths failed due to notch fatigue originating on the outside surface. A random sample of coated pipe was picked and opened for detailed inspection. This pipe presented a mottled appearance on the inside, which to an inexperienced observer, might have indicated a coating failure. However, it was found that the streaks and spots were caused by a calcareous deposit formed over the plastic. This lime scale was removed with acid and the plastic underneath was found intact with no indication of metal pits or fatigue cracks. This condition is important to remember when inspecting coated pipe, since at first inspection it appears as a break in the plastic coat. Figs. 3, 4, and 5 show the coated surface of the sample before and after acid cleaning, compared with an uncoated length in the same string which failed due to internal corrosion fatigue. Inspection of other uncoated lengths in the string revealed advanced corrosion.

The mixed string shipped to Superior Oil Co. for use in West Texas was given the most intensive testing of any to date. Beginning in November 1945, three TXL wells were drilled, without a failure of coated or uncoated pipe. Following completion of the third TXL well, with 24,000 ft. to its credit, the mixed string was laid down and a thorough inspection was made, by Tuboscope Drill Pipe Inspection Service. Of 275 lengths inspected, 123 were rejected as unfit for further service on the basis of condition of all pipe surfaces and wall thicknesses. Uncoated rejects totaled 119 lengths which showed internal corrosion and external scarring. External defects caused rejection of the four coated lengths. On all of the 131 lengths of coated pipe, the plastic was found glossy and intact with no evidence of blistering, abrasion, or separation from the metal.

The company then combined 114 new coated lengths with the 127 remaining coated sections with previous service and made up a solid string of coated pipe for further testing. This was moved to Block 12 field, southwest Andrews County, Texas, where a 7,069-ft. well was drilled. In two additional Block 12 tests, the coated string was substituted for 5⅞-in. pipe below the salt section and 6,400 more feet were added to its drilling service. In these last three tests, the inhibitor sodium chromate was used as further protection against corrosion, being maintained in a concentration of about 2,000 p.p.m. in the drilling mud. No failures occurred due to corrosion fatigue. In November 1946 this string including 127 lengths with a maximum of 37,400 ft. of service and 114 lengths with a maximum of 13,400 ft. of service was again racked for Tuboscope inspection.

Of the 241 pieces, 5 were rejected for further use as No. 4 pipe, 18 were graded No. 3 pipe, recommended for limited service and the remaining 218 pieces were judged No. 2 pipe, fit for further service without reservation. Of the five rejects, three have external cuts of a dangerous stress concentrating nature and two show deep pits, one externally and one internally. The inspection report further stated that the 18 No. 3 lengths are slightly under gage externally due to abrasive wear and in addition show internal corrosive action reducing body wall about 20-25 per cent.

The coating on 70 lengths was reported in perfect condition. These included 62 No. 2 pieces, 5 No. 3 pieces, 3 No. 4 pieces. In the remaining 171 which included at least 44 with limited service, which were coated at the same time as the originals which drilled at TXL, the coating was reported to have parted from the metal in degrees ranging from very small spots to areas approximately half the inside surface of some lengths.

It is possible that some of the streaks and spots which appeared to be bare of plastic were in fact covered with calcareous deposit which was noted in the Thompson & Carr string. This is no reflection on Tuboscope, for the inspector cannot report the coating intact if he cannot see it. If this possibility is true, however, the plastic may be found intact beneath the lime deposit. A further inspection of these lengths, including the opening of some, should definitely determine whether or not the plastic coating has actually failed to the extent indicated. Those who question the report point to the anomaly which it indicates; that the coating on 127 sections stood up under 24,000 ft. of service including three penetrations of the salt section while that on other lengths coated in the same batch failed after 13,400 ft. including only one salt section penetration. The effect of sodium chromate in the last three wells is ruled out by results of laboratory tests which show the coating resistant to strong concentrations of the inhibitor.

Granting failure of the plastic after this prolonged service, Superior management in West Texas still considers it practical, since previous service with uncoated strings gave the company at most, 10,000 ft. of drilling before failure. That company and others in the Permian basin are planning to convert to solid coated drill pipe strings for future drilling where the corrosive salt section is encountered. In addition, Superior has ordered coated pipe for its Bahama operations, where sea water is used in drilling fluid and where the uncoated pipe failed before the first test had been completed. In view of the excessive cost of some drill-pipe failures which result in expensive fishing jobs, or even abandonment of a hole, it is difficult to determine just how much additional footage coated pipe must afford through its protection in order to justify its added cost. However, the record of this pipe in the Permian basin appears to have satisfied a number of operators that it is worth the increased price.

MOBILE Rotary Drilling Unit

Proves efficient in Rocky Mountain Operations

by Neil Williams

RANGELY, Colo.—A new mobile rotary drilling unit manufactured by Winter-Weiss Co. of Denver incorporates a number of innovations in equipment assembly and operation designed to make possible faster and cheaper drilling of shallow wells. The initial unit has been in almost continuous field operation in the Rocky Mountain region since last May. Its performance records have indicated a high degree of efficiency and flexibility under widely varying drilling conditions. Additional units are now being turned out in "assembly line" production.

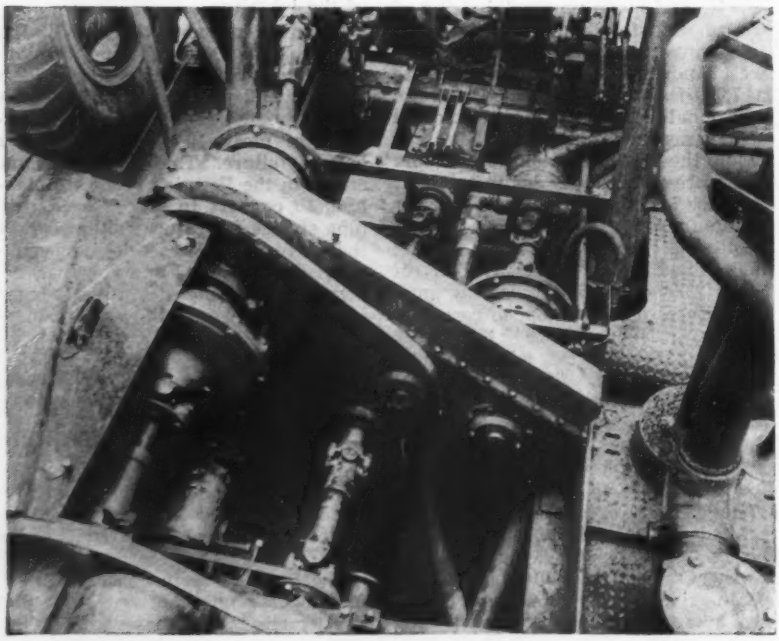
The unit as designed is capable of drilling an 8-in. hole to a depth of 1,000 ft., and a smaller hole to a depth up to 1,500 ft. It has drilled as much as 750 ft. in a single day, and in one test it made 100 ft. in 1 hour. During another series of tests it drilled 6,380 ft. of hole in 21 days' drilling time, or at the average rate of more than 304 ft. daily including moving and shutdown time. The first 3,100 ft. of this was drilled in 11 days' drilling time. In another case, it drilled and completed a 134-ft. water well with casing in 2⅓ hours.

All equipment is truck mounted. Present units utilize a standard 1½-ton Ford truck with 158-in. wheelbase, although most any 1½-ton truck is adaptable. Various shop alterations are made, including installation of a special muffler, heavy-duty bumpers and running boards, safety-tread flooring, and a new-type radiator-hood cowling to provide maximum engine-cooling effect. Screw-operated steady jacks are provided to support the rear of the drill and relieve the truck springs and tires of load while the unit is on location. These are hinged to the truck frame under each side of the rear and fold up against the truck bed when the rig is in transport.

Simplified control design, a hydraulically operated "pull down" for weight control on the bit and for lifting pipe, a new design for slips and break-out tongs, and utilization of standard Ford truck drives, differentials, and universal joints (Spicer) are among the more important innovations. Through utilization of the latter standard truck units, parts for replacements are available almost anywhere so that nearly all minor repairs can be made quickly. The entire rig is designed in unitized subassemblies which can be removed and replaced easily on location with new or rebuilt mechanism. These features combine to minimize shutdown time and permit drilling of more hole.

Power Supply

Power for the rotary turntable, draw works, and slush pump is supplied by the truck motor, using a split-shaft-type power takeoff from the drive shaft. It is constructed of Brown-Lipe transmission parts with a triple chain-and-sprocket drive. The turntable is shaft driven from the power takeoff through a three-speed Brown-Lipe transmission, which, in combination with the four-speed truck-motor transmission, makes available a selection of 12 drilling speeds. The highest is approximately 240 r.p.m. at 2,000 r.p.m. on the truck-motor speed. The mud pump, located at the front of the truck bed back of the cab, and the draw works are driven with one



Left: Looking down on bed of portable drilling-unit truck showing power-transmission assembly. Power shaft from power takeoff at front (not visible) extends through transfer case (center) to rotary turntable transmission (center rear). Transfer case houses sprocket and chain drives to mud pump (left foreground) and draw works (left rear), and to hydraulic pump drive shaft (right). V-belt drive to auxiliary generators appears in center foreground

double shaft with a sprocket-and-chain drive from the power shaft. This drive is housed in a unitized transfer case located about midway on the truck. An additional chain drive is provided in the transfer case to another shaft to the hydraulic pump supplying hydraulic power for raising and lowering the mast and for the hydraulic motor operating the special pipe pull down.

All power is controlled by a series of Twin Disc clutches in various sizes suitable to the requirements of the respective operations. Controls are conveniently grouped at the driller's positions. Included is a hydraulic throttle control for the truck motor permitting finger-tip control of power application.

A 4½ by 6-in. mud pump, reworked by the addition of spiral valves and inserts to increase volumetric capacity and prevent stoppages that might be caused by sand or gravel in the valves, is regular equipment. This pump, with 1½-in. by 10-ft. discharge hose to the swivel, and a 1⅞-in. i.d. kelly bore insures sufficient volume for adequate circulation of mud. Pump rods and liners are chrome plated to increase life and efficiency of the entire unit. A 1-in. triple-braid high-pressure discharge hose for cleaning the rig and operating the injection mud mixer is provided. Accessories include a 2-in. pressure shear valve and two pressure (surge) chambers. The swivel is a patented design which permits free movement regardless of the water pressure it is under.

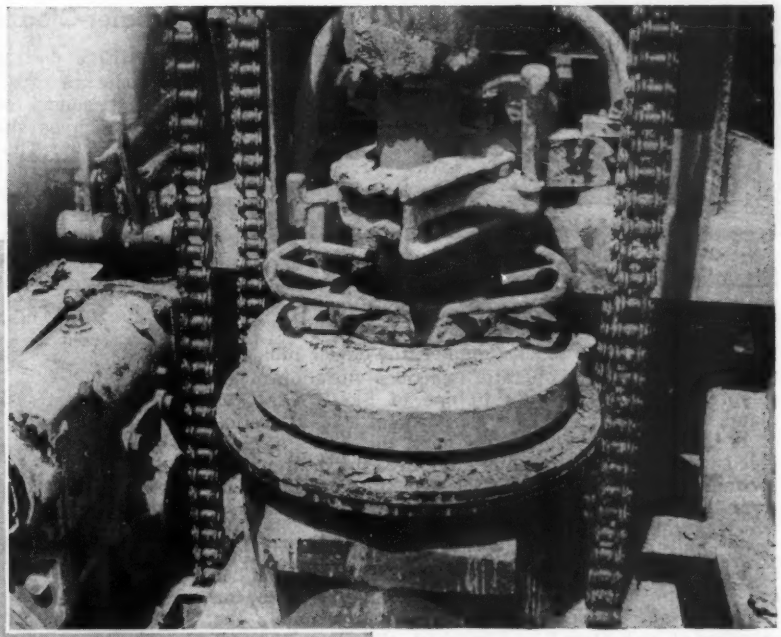
Draw-Works Construction

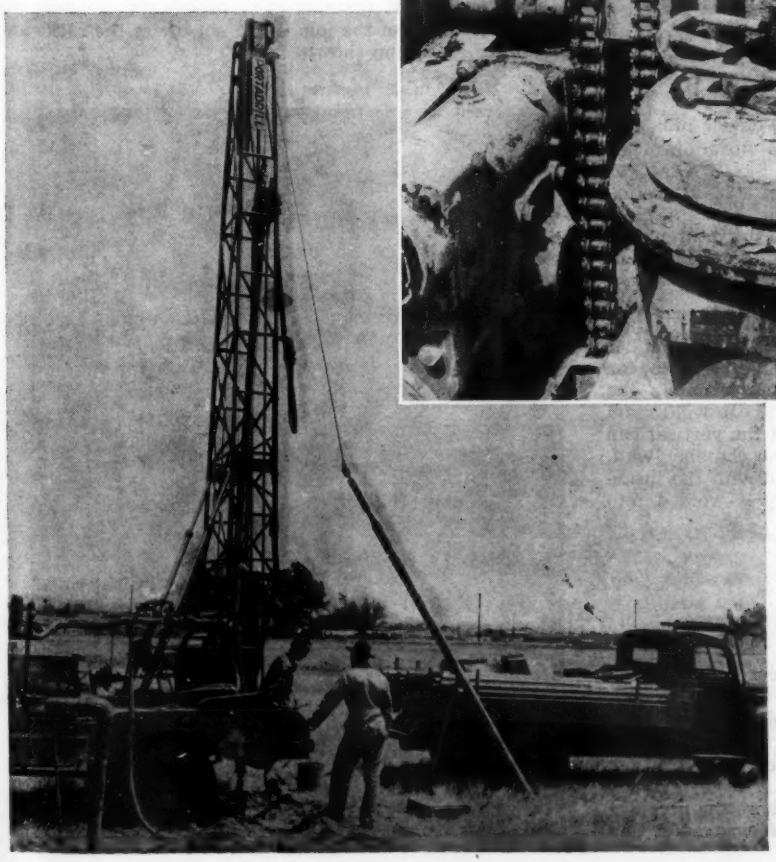
The draw works is of double-drum, ball-bearing construction with a standard 1½-ton Ford truck ring gear and pinion drive. Drive selection is made by a movable spline. A two-piece brake is used on the drum. Brakes are operated with an eccentric-type, combination, positive control. The ball-bearing mounted steel sheaves in the crown block diverge at the rear to lead down to the two drums, and converge at the front over the turntable to prevent the cable from slipping off.

The turntable incorporates heavy-duty Timken bearings and a standard 1½-ton Ford truck ring gear and pinion drive with all moving parts in oil. The entire table is quickly removable to permit setting oversized casing. The standard size of the table opening is 5-in. square. Roller-type breaker slips are employed. A newly designed shock hammer breakout tong, used with the roller-type slips to hold the pipe while a joint is broken and spun out, or made up, eliminates the need for catheads and pipe wrenches or hand tools. With the slips in place, the tong is clamped on, and power applied to the table. The tong is hinge mounted on the back of the truck over the rotary and swings back under the draw works when not in use.

The pull down, driven by the hydraulic motor through a speed reducer, has 16 ft. of travel. It operates either up or down under power, and may be thrown out completely when not in use, a throw-out clutch being provided for this purpose. The drive is by means of two sprockets on the motor and speed-reducer power shaft,

(Continued on page 68)





***Above:** Rear of mobile drill unit showing turntable with slips and new-type breakout tong in position for breaking out joint. Chains on either side, operating over sprockets (not visible) on under side are part of hydraulic pipe "pull down." They are turned by hydraulic motor (lower left)*

***Left:** Mobile shallow drill on location with companion dual-purpose water truck. Water is carried in flat-top compartment forming bed of truck on which drill pipe and other material and equipment are transported*

PLANT PRACTICES

Simple Device Prevents Vibration In Compressor Discharge Line

REFERRED to as a shock chamber, the device indicated in the photograph operates to reduce vibration in the compressor discharge lines in one of Skelly Oil Co.'s plants which operate at 1,800 psi. Made of a 28-in. section of 16-in. pipe and two welding caps, the device is provided with a 1-in. siphon line and valve for draining off condensate. On its inlet side the 6-in. line which comes from the compressor enters the chamber to a distance which permits the flow to be directed upward for 16 or 18 in. and then outward toward the wall of the chamber. Changes in flow direction on the inside of the chamber are accomplished by installing welding elbows to the horizontal and vertical pipe runs. The inlet enters the chamber at its bottom 6 or 8 in. above the cap weld seam and the outlet of the elbow at the end of the vertical run of 16 or 18 in. is located 2½ in. from the chamber wall. The end of the outlet line is welded flush with the inside of the chamber and the entire assembly is welded into the compressor discharge line.

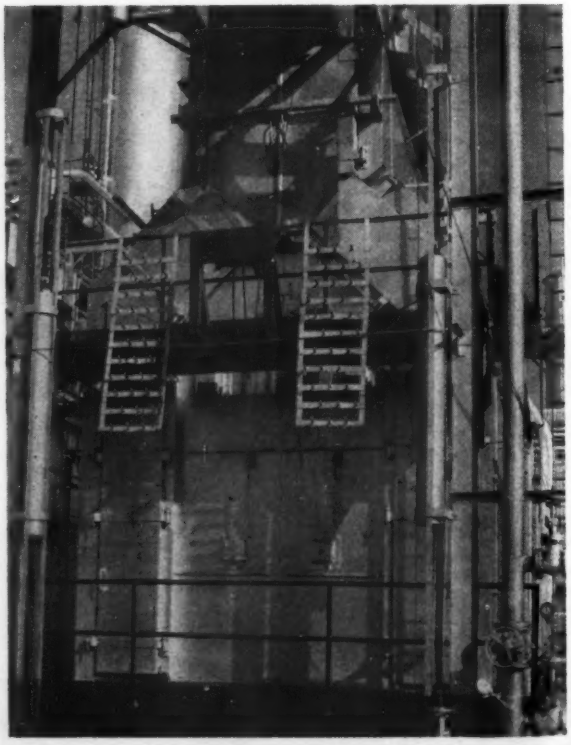
Radiator for Heating Buildings With Hot Oil

A SLIP stream of hot oil is used to heat a building in a plant where no steam is available for the purpose. Any of the popular types of finned pipe sections, connected in series as illustrated and long enough to provide the heating surface necessary to meet heat-transfer conditions will give satisfactory service. The oil may be returned to the plant line at any point where the pressure is less than that of the point where takeoff was made. The

larger this pressure difference is the less will be the radiating surface required for a given set of heat-transfer conditions. A throttling-type valve in the line to the radiator will allow for adjusting the flow volume of hot oil as desired.

Simple Rack Aids Heater-Cleaning Operations

WHERE desirable to replace the same return-bend closure caps on the same fittings from which they were removed for tube cleaning or for other purposes, a rack such as shown in the photograph usually proves satisfactory. The hooks or supports upon which the closures are placed are positioned to match with the furnace's tube-sheet layout. When removed from the fitting the closure is placed on the corresponding hook on the rack where it remains until needed for heading up after completion of the job. While not in use the racks are kept in the position shown.



QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Formula for Boiler Combustion Space

Is there a formula by which combustion space for a boiler can be computed, or the height to set the boiler? —F. E. C.

Combustion space was discussed briefly in our question of November 23, 1946, page 74, but primarily with respect to the space required for oil pipe stills. W. R. Elliott on page 109 of the November 1946 issue of Power Plant Engineering suggests an empirical rule by which the combustion space for straight-tube boilers such as the Heine can be estimated. The rule states that a heat release of 18,500-19,000 B.t.u. of volatile heat per hour can be had for each cubic foot of furnace volume.

"Consider a straight tube boiler similar to a Heine boiler, with a steam load such that one ton of coal must be burned per hour. The fuel will be assumed to be an Indiana coal having the following proximate analysis:

Fixed carbon	42.9 per cent
Volatile	36.3 per cent
Moisture	13.5 per cent
Ash	7.3 per cent

"Heating value as received 11,543 B.t.u. per lb.

"The heating value of the fixed carbon is: 0.429 × 14,600 = 6,263.4 B.t.u. per lb. of fuel.

"The volatile heat in the fuel is therefore 11,543 — 6,263 = 5,280 B.t.u. per lb. of fuel.

"The number of pounds of coal that may be burned per hour per cubic foot of furnace volume is (using the lower heat release figure):

$$18{,}600 \div 5{,}280 = 3.51 \text{ lb.}$$

"Total heat release per cubic foot = 3.51 × 11,543 = 40,515 B.t.u.

"Furnace volume required for one ton per hour equals 2,000 ÷ 3.51 = 569.5 cu. ft.

"This volume must be provided between the stoker and the first bank of tubes in a straight tube boiler.

"If a spreader stoker is used, the average combustion rate will be about 35 lb. per hour per square foot of grate area. The required grate area for 2,000 lb. per hour is therefore 2,000 ÷ 35 = 57.1 sq. ft.

"Therefore the average height of the first bank of tubes above the stoker should be:

$$569.5 \div 57.1 = 9.8 \text{ ft.}"$$

In general the method is found to be satisfactory for semibituminous, bituminous, and subbituminous coals and it has been applied to natural gas by assuming the carbon content to be "fixed" carbon. It is suitable for industrial boilers, H.R.T. boilers and small sectional boilers but it is not recommended for large central power plants using pulverized coal. Elliott states that the method has probably not been applied to anthracite coal or to fuel oil.

Method of Figuring Octane Number of Gasolines

How can we figure the octane number of gasoline without running octane-number tests? We have no machine and want to know about our octane number.—F. A. C.

There is no dependable way to compute octane number although for a particular crude oil and refinery processing it should be possible to establish a reasonably accurate relationship. It is suggested that a number of gasolines be prepared covering all of the anticipated kinds or types of gasolines. All of these samples should be sent to a laboratory for test and the susceptibility of the gasolines to tetraethyl lead should be determined. In all, about 50 octane-number determinations may be required. These tests can be organized or plotted on the type of chart indicated on page 52 of The Oil and Gas Journal of May 13, 1943 (Evaluating Aviation-Gasoline Content of Crude Oil). By means of such a chart the octane number and other major properties of any straightrun gasoline can be accurately estimated. Several such charts should be prepared for different amounts of tetraethyl lead, e.g. 1 cc., 2 cc., and 3 cc.

For cracked gasolines some other method of correlation will be necessary. A promising method is to develop an equation of the type developed by R. B. Cox (Gasoline Octane Rating, Pet. Refiner, p. 31, February 1940). He presents two equations, one for high octane number (62-83) and one for low octane number (15-70):

Octane number (high) = 82.8 — 65 (4 log A.P.I. + 2 log 10 per cent + 1.3 log 90 per cent — 14.46)

Octane number (low) = 71.0 — 132 (3.5 log A.P.I. + 1.25 log 10 per cent + 1.6 log 90 per cent — 12.92)

in which "A.P.I." refers to the A.P.I. gravity at 60° F., 10 per cent and 90 per cent refer to the A.S.T.M. boiling points at 10 per cent and 90 per cent. Logarithms to the base 10 are used. Perhaps the same sort of equation would also be useful for the straightrun gasolines.

Function of Kind of Crude

The octane number of gasolines is primarily a function of the kind of crude oil or stock being processed, nor can exact predictions be made. With respect to straightrun gasoline, the different bases of crude oils contain gasolines of the following octane number (Petroleum Refinery Engineering, McGraw-Hill Book Co., Inc., Second Edition, New York, 1941):

Base—	Oct. No. of 398 e.p. gasoline: Average	Range
Paraffin	40.2	34-53
Paraffin intermediate	45.3	41-50
Intermediate	56.0	50-61
Naphthene and naphthene intermediate	64.9	55-71

With respect to cracked gasolines, the characteristics of the charge stock is important. Mithoff, MacPherson and Sipos (California Crude Oils, The Oil and Gas Journal, page 81, November 6, 1941) judge the suitability of California cracking stocks by what they call the characterization gravity. The characterization gravity is defined as the average gravity of the three fractions of the charge stock that boil at 350°, 450°, and 550° F. at 25 mm. pressure. Although a distillation at 25 mm. pressure is the most direct way to obtain the boiling points, any true-boiling-point curve can be used by converting it to 25 mm. by use of vapor-pressure charts. For California stocks being cracked in cracking units equipped with reaction chambers they find that octane number is related to gravity as follows:

A.P.I. of charge	Oct. No. of gasoline
20	75.9
22	73.8
24	72.0
26	70.5
28	69.2
30	68.0

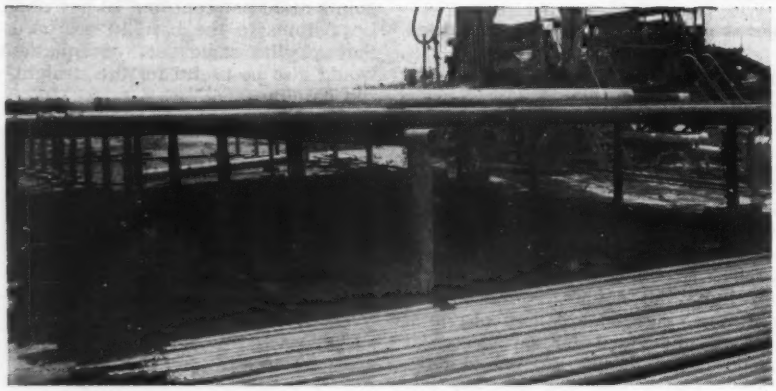
An approximate equation of this relationship is:

Octane number = 90.8 — 0.77 (A.P.I.)

Undoubtedly the conditions of operations will alter the octane number to some degree.

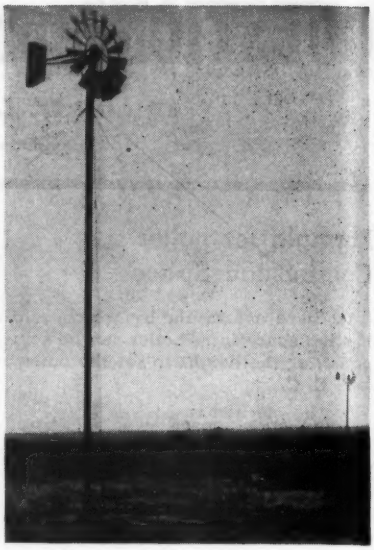
The cost of using too much tetraethyl lead or supplying too good a gasoline, is so great that it would soon pay for an antiknock test engine.

OPERATING IDEAS



Pins Make Pipe Rack Height Easily Adjustable

A PIPE rack for drill pipe and casing has been made of reclaimed pipe fabricated so that the parts of this assembly may be held together by 1-in. steel pins. The height of this rack may be raised as much as 36 in. in order to adjust to the level of the walkway to the derrick floor. This rack is used by Fain-McGaha Oil Co., Holliday, Tex.



Windmill for Pumping Shallow Wells

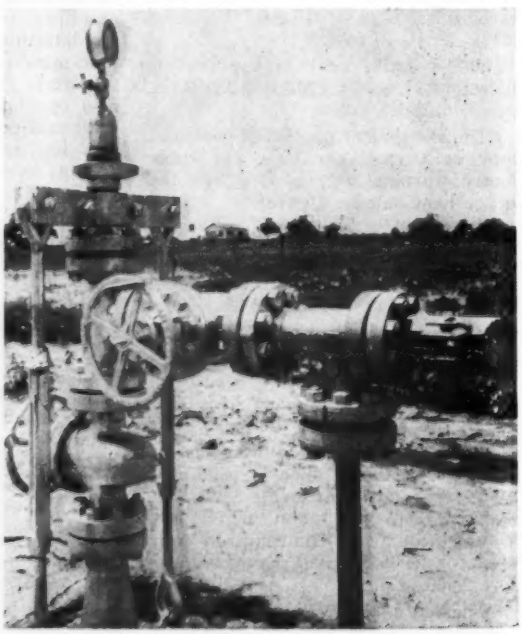
IN the shallow producing area between Wichita Falls and Burkburnett, Tex., a production superintendent personally acquired a lease having several wells each pumping less than a barrel per day from depths between 200 and 300 ft. Adequate and economical pumping for his purposes was provided by installing windmills of a type commonly used on farms for pumping water. Each of these is supported on a mast held by guy lines. The only attendance now given is when the owner visits the lease twice a week.

Bearing Catcher on Cone Basket

A BEARING catcher has been devised which is installed above the cone basket, commonly referred to as the junk basket. After the cones are picked up by means of the basket, the bearings are washed into the top of the tool by pump circulation. In this way it is possible to get the cones and bearings in one trip. The bearing catcher was designed by Frank Cromwell, driller, for Guy Mabee, Inc.

Locking Device for Flow Valve

A LOCKING device for the flow valve of a well has been made by using a piece of 4-in. pipe slotted to slip over the two-wing throttle. A padlock is used to hold it securely in either an open or a closed position. The well shown in the illustration is located at the lower end of the West Edmond field, Oklahoma, near a resort area in the vicinity of the Oklahoma City water reservoir.



A Radial Reservoir

*by Park J. Jones**

OIL PRODUCTION by water

PART 12 OF A SERIES

THE characteristics of a radial reservoir and the capacity to produce undersaturated oil at MER by edge water are indicated. Location and spacing of producing and injection wells for the reservoir will be considered in the next article.

Structure and Stratigraphy

A RADIAL reservoir having edge water is represented by Figs. 12-1 through 12-4. The first figure shows structural contours on top of pay. Productive area is limited on the north side by an E-W fault. The fault is approximately vertical. The other sides of the reservoir are bounded by water. The contours are relative to the elevation of the water contact. The latter is at zero elevation irrespective of depth. Subtract contour elevation from depth to water contact and obtain depth to top of pay.

The closure is approximately 200 ft. This is a radial-type reservoir and is called the R-1 reservoir. The assumed structural symmetry is for illustrative purposes only.

Fig. 12-2 gives the structural contours on the bottom of the pay in the R-1 reservoir. The water contact along the bottom of pay, zero-water contour, is about 2,300 ft. from the water contact along the top of pay or zero-oil contour.

Fig. 12-3 illustrates the N-S section through the center of the R-1 reservoir. Most reservoirs have impermeable breaks. Individual pay intervals may be separated by impermeable breaks which have considerable areal extent. Fig. 12-3 does not show any impermeable breaks. The absence is for illustrative purposes only. In practice, deductions for nonpay commonly have to be made over sizable portions of a reservoir or even over an entire reservoir.

Fig. 12-4 is the pay thickness for the R-1 reservoir. The region between the zero and 60-ft. contours has bottom water. The assumed stratigraphic symmetry is for illustrative purposes only. The producing characteristics of reservoirs having variable stratigraphy will be considered later.

*Production consultant, Houston.

Some Basic Data

Table 12-1 contains some basic data for the R-1 reservoir. The productive area is 4,020 acres. The average pay thickness is 48.1 ft. Porosity averages 20 per cent and interstitial water, 25 per cent of porosity. The initial reservoir pressure is 3,000 psia. and the temperature, 170° F.

TABLE 12-1—BASIC DATA FOR THE R-1 RESERVOIR

Productive area, acres	4,020
Average pay thickness, ft.	48.1
Acre-feet of pay	193,300
Average radial distance to water contact, ft.	10,560
Average porosity, per cent	20
Average interstitial water, per cent of porosity	25
Initial reservoir pressure, psia.	3,000
Reservoir temperature, °F.	170
Saturation pressure, psia.	1,200
Solution gas, cu. ft. per bbl.	200
Volume factor at 3,000 psia., bbl. per bbl.	1.11
Viscosity of reservoir liquid, cp.	2.8
Viscosity of water, cp.	0.78

Properties of Fluids

The saturation pressure for the oil in the R-1 reservoir is 1,200 psia. There are 200 cu. ft. of gas in solution at 1,200 psia. The volume factor at 3,000 psia. and 170° F. is 1.11 bbl. of reservoir space per barrel of oil. The volume factor is in terms of the average separator pressure and temperature likely to be used for the production from the R-1 reservoir. The viscosities of reservoir liquid and water are 2.8 and 0.78 cp. respectively.

In-Place and Recoverable Oil

The R-1 reservoir has 193,300 acre-feet of pay. The corresponding reservoir space is 7,758 (0.2) (0.75) or 1,164 bbl. per acre-foot. The volume factor is 1.11. So the in-place oil is 1,164/1.11 or 1,050 bbl. per acre-foot. The in-place oil for the reservoir is 193,300 (1,050) or about 203 million barrels.

The fluid factor is given by 1.11 (2.8)/0.78 which is equal to about four. Hence the oil recoverable aside from economic limits is (80 — 4) or 76 per cent of in-place oil or 800 bbl. per acre-foot or about 154 million barrels for the reservoir.

Convergence of Reserve

The first two columns in Table 12-2 show the relationship between elevation and distance from the water contact along the top of pay. Pass horizontal planes through the R-1 reservoir at the elevations listed in the

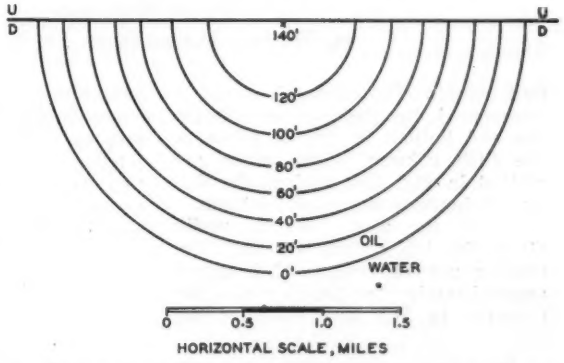


Fig. 12-2—Contours on bottom of pay in the R-1 reservoir; contours show elevation above water contact

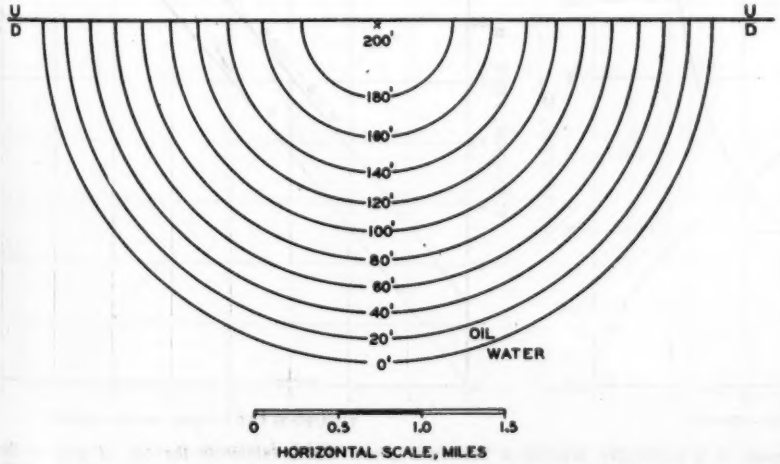


Fig. 12-1—Contours on top of pay in the R-1 reservoir; contours show elevation above water contact

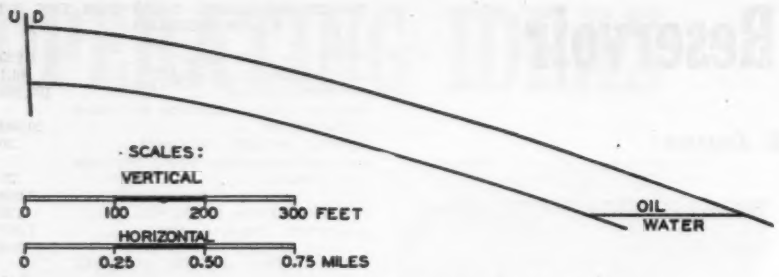


Fig. 12-3—N-S section through the center of the R-1 reservoir

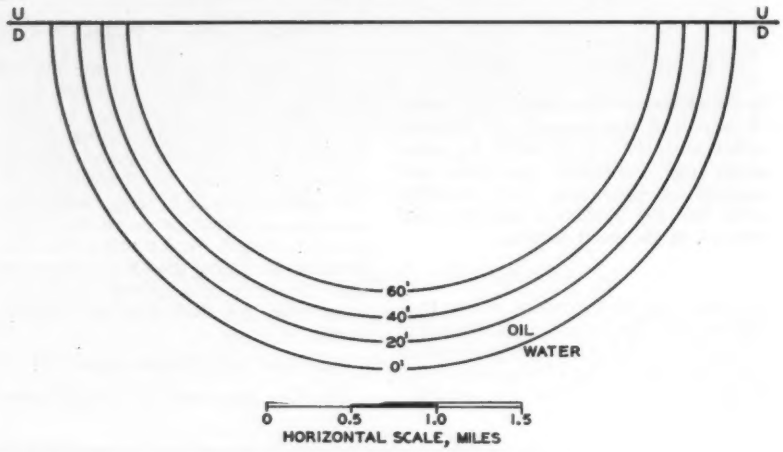


Fig. 12-4—Pay thickness for the R-1 reservoir

first column. The productive area A intercepted by the planes between top and bottom of pay is given in the fifth column. These areas are plotted in Fig. 12-5 against the distances shown in the second column.

Denote the area 1,000 ft. updip along the top of pay by "a." The convergence of reserve C is given approximately by $2A/(A + a)$. The C curve in Fig. 12-5 indicates the approximate convergence in the R-1 reservoir for distances ranging from zero up to 6,000 ft. The convergence relative to the water contact is about 1.03. At 6,000 ft. updip from the water contact, the convergence of reserve is about 1.24. The gradual increase in convergence is caused by the shorter length of contours in the updip direction. The comparatively rapid increase in convergence beyond 4,000 ft. is caused by the fault.

TABLE 12-2—PRODUCTIVE AREA AND ACRE-FEET, R-1 RESERVOIR

Elev.	Feet	Productive acres Top	Bottom	A	Thousand acre-feet ah	Σ ah
..	....	4,020	2,450	1,570	...	...
20	730	3,480	1,970	1,510	30.8	30.8
40	1,520	2,950	1,540	1,410	29.2	60.0
60	2,310	2,450	1,130	1,320	27.3	87.3
80	3,170	1,970	790	1,180	25.0	112.3
100	4,030	1,540	475	1,065	22.5	134.8
120	4,950	1,130	204	926	19.9	154.7
140	5,870	790	....	790	17.2	171.9
160	6,930	475	....	475	12.6	184.5
180	8,280	204	....	204	6.8	191.3
200	10,560	....	....	....	2.0	193.3

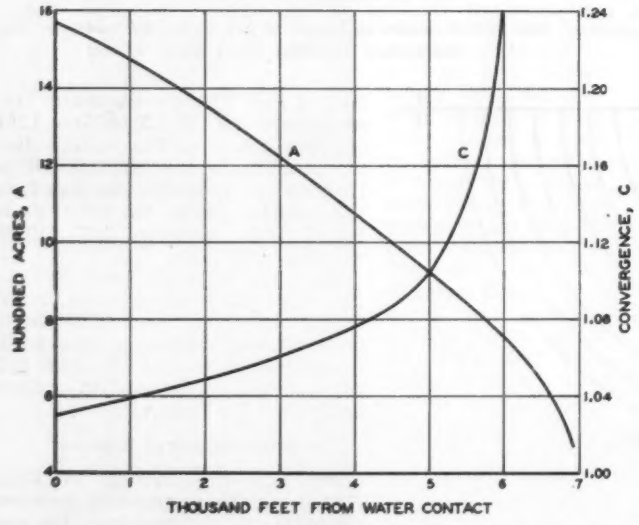
Average pay thickness = 193,300/4,020 = 48.1 ft.

The B and M Contours

The B curve in Fig. 12-6 shows the elevation of the oil-water interface in terms of the distance advanced from the water contact by the oil-water interface along the top of pay.

The position of the M contour is 1,000C ft. downdip from the B contour. For instance, the B contour has to advance about 1,030 ft. updip before the M contour begins advancing.

The elevation for any position of the M contour is obtained by dropping vertically from any point on the M curve down to the B curve. Reference to Fig. 12-2 will show that the R-1 reservoir is entirely underlain by bottom water when the M contour reaches the 140-ft. level. Edge water becomes bottom water when M reaches the 140-ft. elevation. The ele-



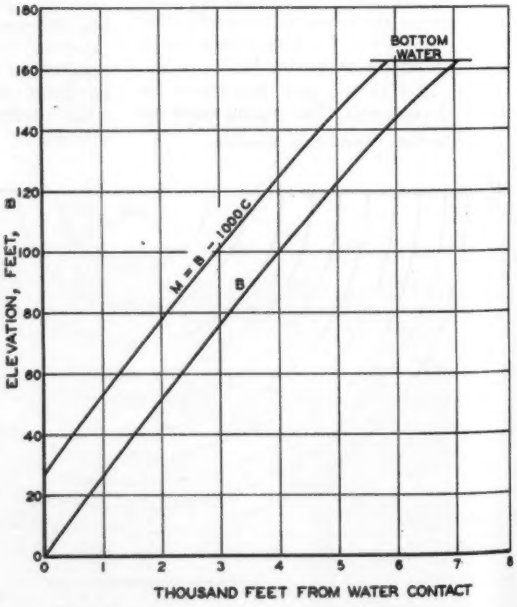


Fig. 12-5—(Left) Convergence in the R-1 reservoir; A is productive area in a horizontal plane which intersects the top of pay at the indicated distances from water. Fig. 12-6—(Right) Position of M contour relative to the B contour in the R-1 reservoir; drop vertically from M to B and obtain the elevation of the M contour

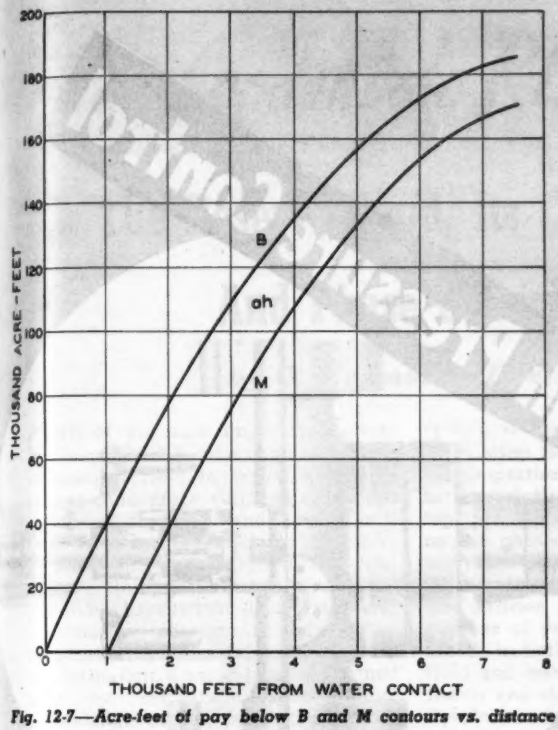


Fig. 12-7—Acre-feet of pay below B and M contours vs. distance advanced along top of pay by the B contour

vation of the B contour is about 162 ft. when the M contour is at the 140-ft. level.

The foregoing considerations are relative to no production of water from the acre-feet of pay within a B-M region. If water is produced, the elevation of the B contour is less than 162 ft. when the M contour is at the 140-ft. level.

Invaded Acre-Feet

The last column in Table 12-2 gives the acre-feet of pay in terms of the distance from the water contact along the top of pay. These data are indicated by the B curve in Fig. 12-7. The M curve in Fig. 12-6 shows the lag of the M contour behind the B contour. The acre-feet of pay below the B contour corrected for the lag gives the acre-feet of pay below the M contour.

Cumulative Oil Recovery

The procedure used to estimate cumulative oil recovery from the R-1 reservoir is itemized in Table 12-3. The first line is the distance advanced by the oil-water interface along the top of pay. The second line is the acre-feet of pay invaded by water. The fourth line gives the acre-feet of pay within the B-M region for various positions of the oil-water interface.

An oil-water interface has to advance about 1,000C ft. before the B-M region is fully developed. For a fluid factor of four and 800 bbl. per acre-foot of recoverable oil, the oil displaced from a developing B-M region increases from about 300 up to 530 bbl. per acre-foot. The oil displaced from a fully developed B-M region is here about 530 bbl. per acre-foot. The acre-feet within the B-M region varies with the structural position of the oil-water interface. The volume of a B-M region decreases if water is produced.

Oil recovery from the acre-feet below an M contour is 100 per cent of the recoverable oil. The latter is 800 bbl. per acre-foot for the R-1 reservoir. The cumulative oil recovery for any position of the oil-water interface is equal to the sum of the recoveries from the B-M region and from below the M contour. The estimated reserve for encroaching, or injected, edge water is 144.8 million barrels.

Cumulative Recovery and Time

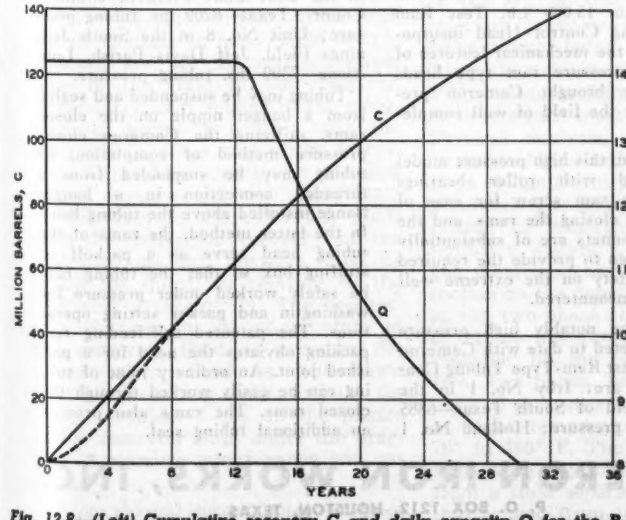
The C curve in Fig. 12-8 shows the cumulative recovery from the R-1 reservoir produced at a MER of 200 ft. per year. The data were obtained from Table 12-3. The dashed portion of the C curve is for displacement by water. The solid curve is for oil production by displacement and

(Continued on page 68)

TABLE 12-3—CUMULATIVE OIL RECOVERY FROM THE R-1 RESERVOIR

Thousand feet for B	.25	.50	.75	1.0	2.0	3.0	4.0	5.0	6.0	7.07
Thousand acre-feet for B	10	20	30	40	77	108	134	151	172	186
Thousand acre-feet for M	..	..	..	..	39	75	107	132	154	171
Thousand acre-feet for B — M	10	20	30	40	38	33	27	19	18	15
Bbl. per acre-foot for B — M	300	370	450	530	...	...	...	...	...	530
Million barrels from B — M	3.0	7.4	13.5	21.2	20.1	17.5	14.3	10.1	9.5	8.0
Million barrels for M*	..	..	..	..	31.2	60.0	85.6	105.6	123.2	136.8
Cumulative oil recovery, million barrels	3.0	7.4	13.5	21.2	51.3	77.5	99.9	115.7	132.7	144.8

*At 800 bbl. per acre-foot.



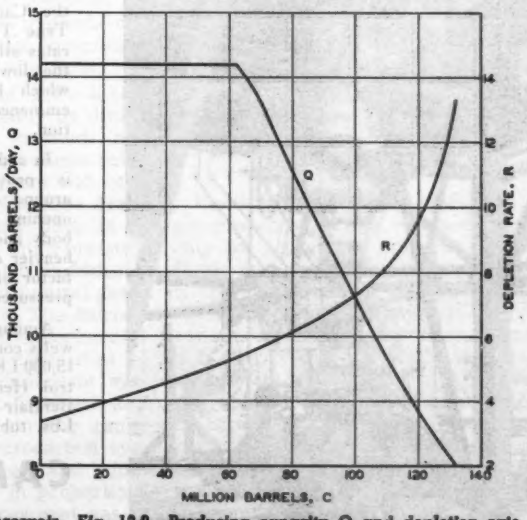
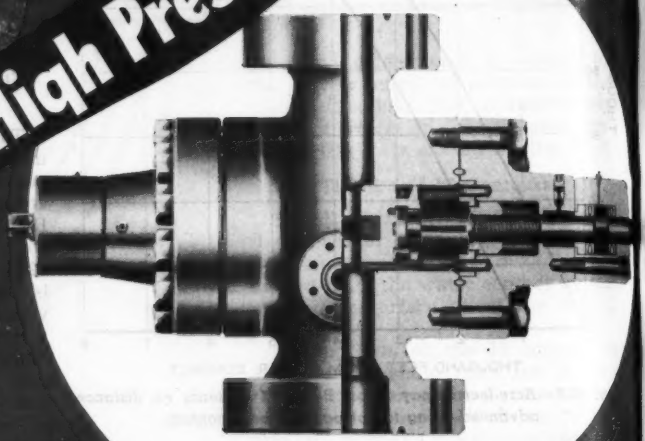


Fig. 12-8—(Left) Cumulative recovery C and daily capacity Q for the R-1 reservoir. Fig. 12-9—Producing capacity Q and depletion rate R vs. cumulative oil recovery C from the R-1 reservoir produced at MER by water and 5,000,000 bbl. by expansion; depletion rate is in per cent per year of recoverable oil

The Last Word in High Pressure Control



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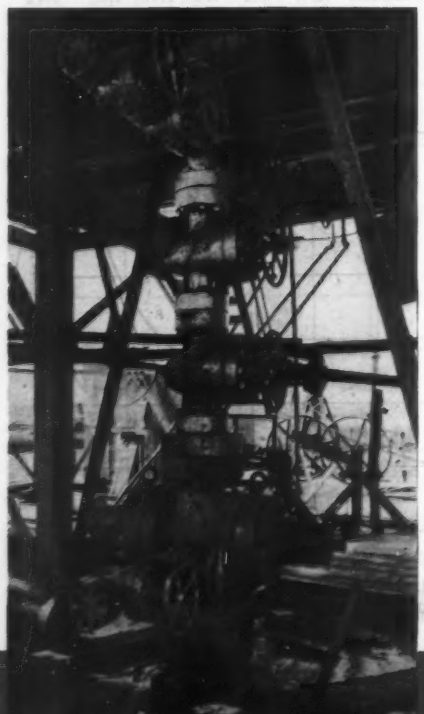

15,000 LB. TEST PRESSURE RAM TYPE TUBING CONTROL HEAD

As shown in the cut-away view above, the Cameron 15,000 Lb. Test Ram Type Tubing Control Head incorporates all of the mechanical features of the lower pressure ram type heads which have brought Cameron pre-eminence in the field of well completion.

In addition, this high pressure model is provided with roller bearings around each ram screw for ease of opening and closing the rams, and the body and bonnets are of substantially heavier design to provide the required factor of safety on the extreme well pressures encountered.

Among the notably high pressure wells completed to date with Cameron 15,000 Lb. Test Ram-Type Tubing Control Heads are: Irby No. 1 in the Berclair Field of South Texas—6885 Lbs. tubing pressure; Holland No. 1 in the Blue Lake Field of Brazoria County, Texas—8200 lbs. tubing pressure; Unit No. 8 in the South Jennings Field, Jeff Davis Parish, Louisiana—7300 lbs. tubing pressure.

Tubing may be suspended and sealed from a hanger nipple on the closed rams, utilizing the Cameron closed pressure method of completion, or tubing may be suspended from a threaded connection in a hanger flange installed above the tubing head. In the latter method, the rams of the tubing head serve as a packoff or stuffing box so that the tubing may be safely worked under pressure for washing-in and packer setting operations. The patented self-feeding ram packing obviates the need for a polished joint. An ordinary joint of tubing can be easily worked through the closed rams. The rams also provide an additional tubing seal.

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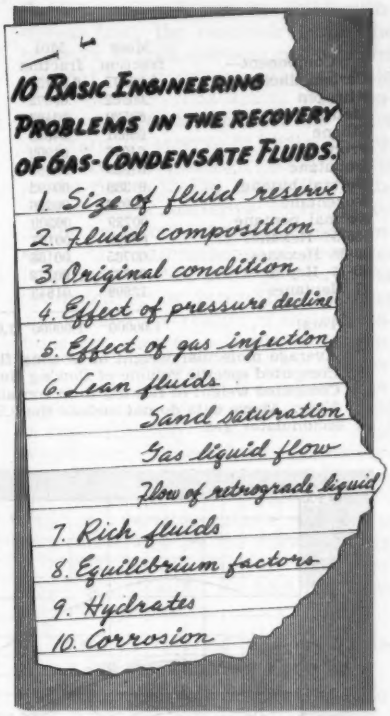
1. The Reserve Fluid, Its Composition And Phase Behavior

by C. Kenneth Eilerts*



ONE of the most important factors considered by the engineer in developing a field in which a reserve of gas-condensate fluid exists is the nature of the fluid and how it will behave under the methods of recovery that may be practiced. Gas-condensate fluids usually are in a single, gas-like phase when discovered, and if reservoir pressure is reduced by subsequent withdrawals of fluid from the formation, a liquid phase is formed also by retrograde condensation. Knowledge of the properties of the fluid makes possible estimates of the recoverable reserve of hydrocarbons and provides information on the original phase state and on the changes in the phases that will occur as recovery proceeds. Such information also aids in determining the best method for the recovery of liquid hydrocarbons from the formation and is helpful in the many problems of operating and maintaining production equipment and plants.

As soon as an economically important reserve of gas-condensate hydrocarbons is discovered, solutions, at least tentative ones, must be found for a number of problems including the following: (1) Size of the fluid reserve; (2) composition of the fluid and its richness in marketable hydrocarbons; and (3) the original phase state of the fluid in the reservoir, particularly as it relates to the possibility of liquid in contact with the gas phase in some part of the formation. Depending largely on the size of the reserve and the phase state of the fluid in the reservoir, plans must be made for recovery of the hydrocarbons and answers must be found for questions relating to the following problems: (4) The progressive changes in the phase state of the reservoir fluid as pressure declines when fluid is withdrawn through producing wells; and (5) the effect of injected gas on the phases of the reservoir fluid under the practice of pressure maintenance and gas drive.

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THIS is the first of three articles relating to uses of information on the properties of gas-condensate fluids in the solution of reservoir-engineering problems. Applications of data on the phases of fluids at significant pressures and temperatures are shown in discussions of 10 basic problems. The articles are the outgrowth of a number of years of experimental research in both the laboratory and the field and were prepared to show the trends and significance of technologic developments rather than to review what has been accomplished.

1. Determining Size of a Fluid Reserve

Underground reserves of gas-condensate fluids may be estimated by two methods. The porosity-area method[1] can be used if enough wells have been drilled to outline the reservoir and to permit determination of the average thickness, porosity, and interstitial water content of the productive formations. The pressure-volume method[2] of estimating fluid reserves in reservoirs of constant volume involves use of cumulative production statistics and accurate measurements of the change that has occurred in reservoir pressure. Both methods require a knowledge of the compressibility characteristics of the fluid.

The compressibility of a fluid can be determined most reliably by direct physical analysis, but methods are available for estimating volume relations at significant pressures and temperatures. The Natural Gasoline Association of America has adopted a tentative standard of high-pressure gas measurements[3] which includes a section on the density of natural gases in the two-phase region. The Bureau of Mines has reported experimental research[4] on the compressibilities of five, two-phase, gas-condensate systems at pressures up to 5,000 psi. and at eight temperatures in the range 70° to 280° F. The hydrocarbon systems were mixtures of gas and liquid from a field separator in proportions that ranged from 100 per cent gas to 50 per cent gas and 50 per cent liquid. The maximum difference in the values of the compressibility factors of the mixtures at a given pressure and temperature averaged less than 6 per cent of the average value of the factors. Although the compressibility of a gas-condensate fluid does not appear to be markedly dependent on its composition, it is important, nevertheless, to know the composition if compressibility factors are to be estimated with accuracy.

A method of measuring the relative amounts of hydrocarbon liquid and gas in a formation is discussed later.

2. Composition of Gas-Condensate Fluids

Knowledge of the composition of gas-condensate fluids is essential not only for estimating properties of the fluids at significant pressures and temperatures but for determining the reserves of specific hydrocarbon components. Table 1 gives the composition of a typical gas-condensate fluid which was a single, gas-like phase in the natural reservoir. The assembly of three low-temperature fractionating columns and the analytical procedure[5] used in obtaining the data were especially designed for accurate determination of the heavy hydrocarbons. Columns 6 and 7 of Table 1 show the volumes of liquid motor-

TABLE 1—COMPOSITION OF THE FLOWING FLUID BASED ON A LIQUID-GAS RATIO 29.68 BBL. (77.57 LB. MOLS) OF ACCUMULATOR LIQUID AT 810 PSIA. AND 80° F., PER MILLION CUBIC FEET (2,582.2 LB. MOLS) OF ACCUMULATOR GAS AT 14.4 PSIA., 60° F.

	1	2	3	4	5	6	7	8
			Fluid components produced with 1,000 cu. ft. of accumulator gas expressed as cu. ft. of gas			Fluid components produced with 1,000 cu. ft. of accumulator gas expressed as gal. of liquid		
Component—	Mass fraction	Mol fraction	Accumulator gas	Accumulator liquid	Flowing fluid	Accumulator gas	Accumulator liquid	Flowing fluid
Carbon dioxide	0.00277	0.00130	1.30	0.04	1.34	....	....	....
Nitrogen	.00102	.00075	.77	.00	.77	....	....	....
Methane	.69520	.89498	916.90	4.88	921.87	....	....	....
Ethane	.06631	.04555	45.41	1.51	46.92	....	....	....
Propane	.04077	.01909	18.06	1.61	19.67	....	....	....
Isobutane	.01309	.00465	4.09	.70	4.79	0.130	0.022	0.152
Normal butane	.01389	.00493	4.06	1.03	5.09	.125	.032	.157
Isopentane	.00928	.00266	1.74	.99	2.73	.062	.035	.097
Normal pentane	.00729	.00209	1.26	.89	2.15	.045	.032	.077
135-56 Hexanes	.00622	.00197	.84	1.19	2.03	.034	.048	.082
56-35 Hexanes	.00785	.00188	.70	1.24	1.94	.028	.050	.078
35-17 Heptanes	.00832	.00172	.41	1.36	1.77	.019	.061	.080
17 Heptanes+	.12599	.01843	4.37	14.60	18.97	.243	.810	1.053
Total	1.00000	1.00000	1,000.00	30.04	1,030.04	0.686	1.090	1.776

Average molecular weight of flowing fluid = 20.64.
Computed specific volume of flowing fluid at 14.4 psia., 60° F., cu. ft. per lb. = 18.38.
Computed weight of flowing fluid containing 1,000 cu. ft. of accumulator gas, lb. = 54.90.
Note: Above data do not include the 0.53 bbl. of water produced per million cubic feet of accumulator gas.

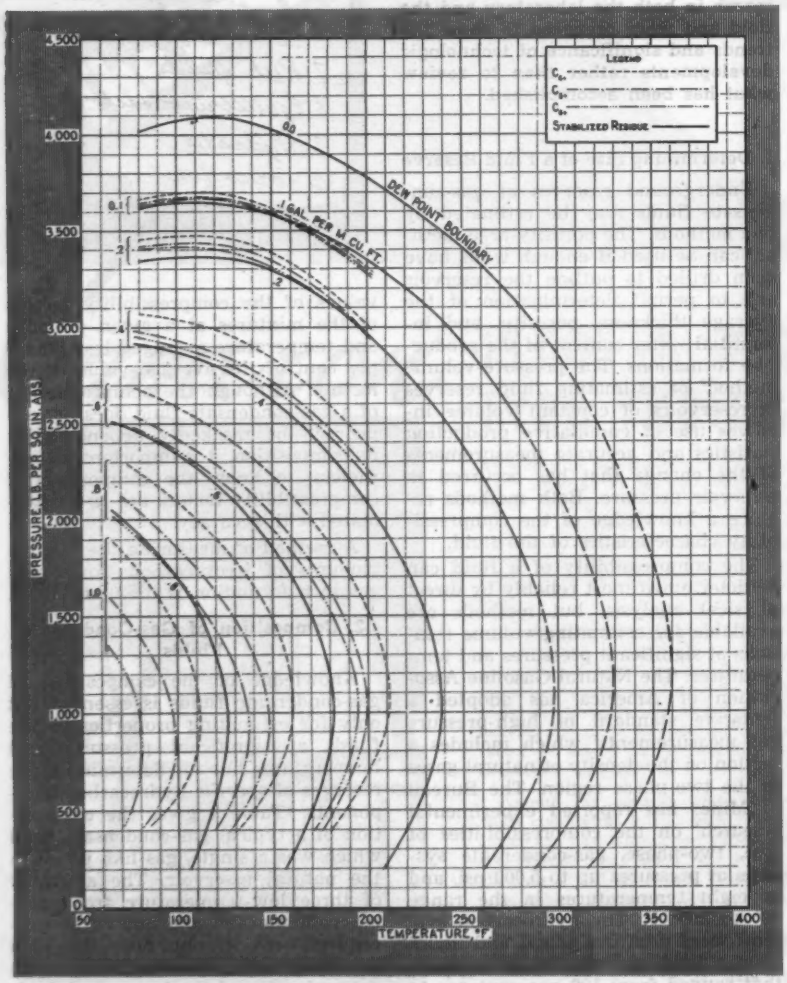

Fig. 1—Ratios of flowing fluid liquid phases residues by distillation and by equilibrium stabilization at atmospheric pressure

fuel components contained in the gas and liquid phases of the fluid under equilibrium conditions prevailing in a separator at the well. The total volumes of each of the liquefiable hydrocarbons contained in the fluid are given in Column 8, and in Column 2 are tabulated the mol fraction data required for estimating the physical properties of the fluid at temperatures and pressures prevailing in the formation, the flowstring and surface flow equipment of the well.

3. Phase State of the Fluid in the Reservoir

The phase relations of the heavy components of the fluid, the composition of which is given in Table 1, are illustrated in Fig. 1. The equipment and methods used for obtaining the information required to prepare the phase diagram have been described in previous publications.[1] The dew point of the fluid at reservoir temperature (199° F.) was 65 psi. less than the reservoir pressure. As the fluid had been withdrawn from the reservoir under carefully controlled, steady-flow conditions, the fluid tested at the surface is considered to represent the reservoir fluid; therefore, it is construed from the results of the tests that a liquid phase was not present in the reservoir at the time the sample of the fluid was obtained. This information and that gained from a Bureau of Mines Hempel distillation of a sample of the 52.7° A.P.I. gravity condensate from the stock tank did not indicate that oil might be found by drilling wells on the flanks of the productive formation below the gas.

4. Changes in Phase State of Reservoir Fluid as Pressure Declines

The curves in Fig. 2 show how a liquid phase would be formed in fluid under discussion if reservoir pressure were allowed to decline; they show also the progressive changes that would take place in the composition of the liquid phase. The dew point—the pressure at which the first drop of liquid condenses out of the fluid as the pressure is decreased—is 3,790 psia. at reservoir temperature. It is indicated in Section B, Fig. 2, that 0.26 gal. of liquid per 1,000 cu. ft. of gas would form at reservoir temperature (199° F.) if the pressure were reduced to 3,000 psia. Of this liquid, 0.21 gal. would be butanes and heavier components. As indicated in Section A, Fig. 2, hexanes and heavier components would constitute 50 mol per cent of the total liquid, and 42 mol per cent would be propane and lighter components. If the pressure continued to decrease, more liquid would be condensed out of the gas, and a higher mol per cent of the liquid would be hexanes and heavier hydrocarbons. At a pressure of 1,000 psi., 0.59 gal. of hexanes and heavier hydrocarbons

TABLE 2—AMOUNT OF LIQUID PHASE THAT WILL BE PRECIPITATED FROM A GAS-CONDENSATE FLUID (TABLE 1) AT 199° F. IF PRESSURE IS LOWERED BY PRODUCING GAS FROM THE RESERVOIR

Per cent of gas removed	Estimated pressure, psia.	Cumulative liquid in reservoir, gal. per M.c.f. of initial gas reserve				
		Total liquid	Butanes* plus	Pentanes* plus	Hexanes* plus	Accumulator residue†
10	3,370	0.10	0.08	0.07	0.07	0.08
20	2,935	.25	.20	.19	.18	.18
30	2,550	.36	.30	.27	.27	.25
40	2,180	.43	.37	.34	.33	.31
50	1,830	.48	.42	.38	.37	.35
60	1,490	.50	.45	.41	.40	.37
70	1,140	.51	.46	.42	.42	.38
80	780	.50	.45	.42	.41	.38
90	400	...	...	.41	...	.37
100	0	...	...	...	...	...

*Residue obtained by fractionation of total liquid. †Residue obtained by equilibrium stabilization of total liquid at atmospheric pressure.

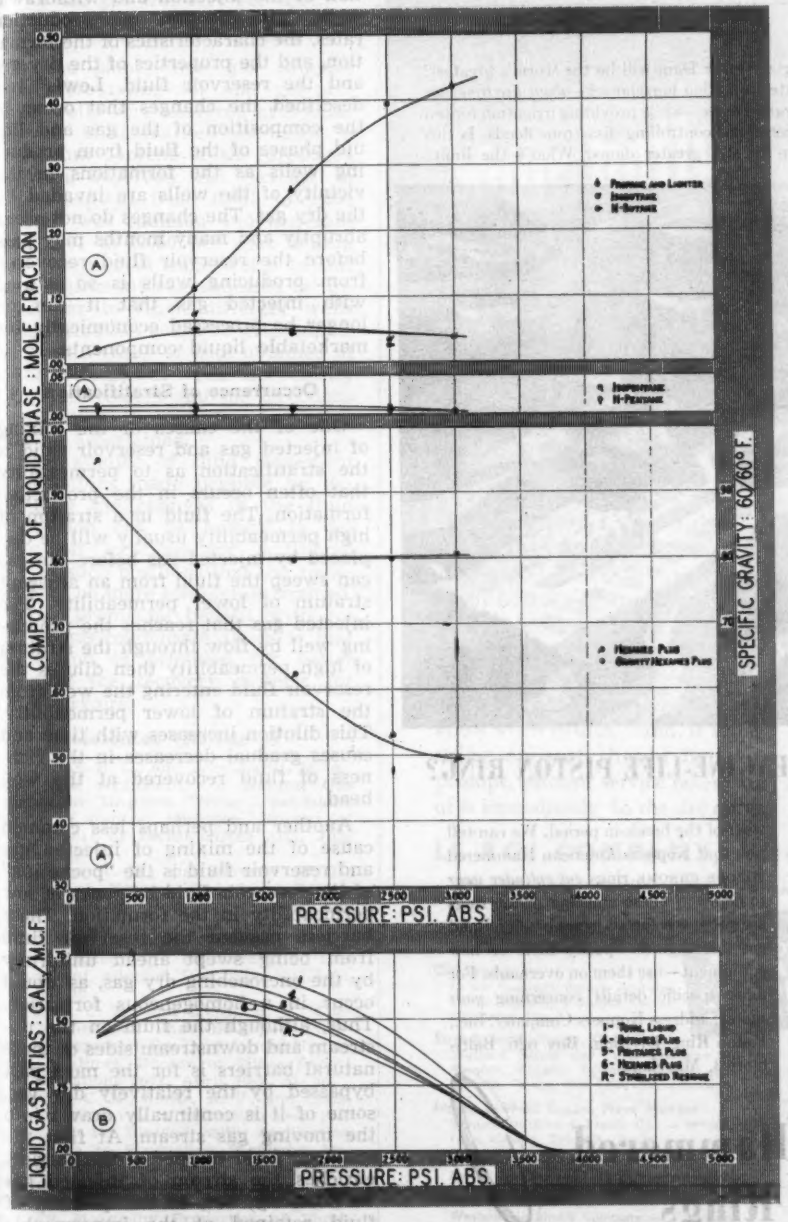
COMPOSITION OF LIQUID PHASE : MOLE FRACTION
SPECIFIC GRAVITY: 60/60° F.
PRESSURE: PSI. ABS.
LIQUID GAS RATIOS : GAL./M.C.F.
PRESSURE: PSI. ABS.

Fig. 2—Liquid-gas ratios of the flowing fluid on a component basis: A—Composition of the liquid phase at reservoir temperature (199° F.). B—Volume of liquid component residues at reservoir temperature and indicated pressures

per 1,000 cu. ft. of gas or 45 per cent of the original fluid content of this fraction (Table 1, Column 8) would be condensed in the formation.

Not all of the fluid in the reservoir would be subjected to such a reduction of pressure before it left the reservoir. Reservoir pressures decline as fluid is removed, and the fluid withdrawn from the reservoir while the pressure is high contains more of the original heavy components than fluid removed later. The actual condensation in the formation from the entire underground reserve of hydrocarbons, therefore, is not as high proportionally as the curves in Fig. 2, Section B, indicate. The cumulative condensation in the reservoir from the original reserve of hydrocarbons, at pressures less than the dew-point pressure, was estimated by an integration of these curves, and the results of the calculations are shown in Table 2. In general, the condensation within the reservoir that occurs as the pressure declines because of the removal of fluid is approximately 70 per cent of what would be measured if the same lowering of pressure were obtained by simply expanding the original reservoir fluid in a variable-volume vessel. The data illustrated by the curves in Fig. 2 are the equivalent of data that would be obtained by such an hypothetical method.

5. Effect of Injected Gas on Phases of the Reservoir Fluid

Even if reservoir pressure is maintained by gas injection liquid might be precipitated in the formation because of the mixing of a "cycled" gas denuded of butanes and heavier components with the reservoir fluid. Olds, Sage and Lacey[5] found that when only the butanes and most of the pentanes were removed from a reservoir fluid its dew-point pressure at reservoir temperature was increased 558 psi. At the pressure of the dew point of the reservoir fluid, the modified fluid so prepared includes a liquid phase amounting to 9 per cent of the volume of the modified fluid at that pressure. However, there is an important difference between the modified fluid used in these tests and the mixture of hydrocarbons that results when cycled gas is mixed with reservoir fluid. The modified fluid prepared by Olds, Sage, and Lacey by removing butanes and pentanes from the reservoir fluid contained a greater mol fraction of hexanes and heavier components than did the reservoir fluid. When cycled gas from which butanes and heavier components have been removed is mixed with reservoir fluid, the mol fraction of hexanes and heavier components in the mixture becomes less than that of the original fluid.

Sage and Lacey[5] have shown that when single hydrocarbon components are mixed with methane, the maximum critical pressures of the mixtures

increase as the molecular weight of the component diverges from that of methane. Also, if the mol fraction of the component that is mixed with methane to obtain the maximum critical pressure is diminished, the value of the critical pressure of the mixture will decrease as the composition of the mixture approaches 100 per cent methane. On the basis of this information, it is apparent that removal of butanes and pentanes from a reservoir fluid increases its dew-point pressure at a given temperature because the remaining components of the mixture are not only the most dissimilar ones but are increased in concentration. However, on the same basis, the removal of a part of the heaviest component also would tend to decrease the dew-point pressure. It follows then that the reliable way to determine to what degree the dew point of a reservoir fluid changes when cycled gas is mixed with it is to test prepared samples of the anticipated mixtures. Bureau of Mines tests[4] show that if a separator gas (in this case a produced gas containing 0.6 gal. of butanes and heavier components per 1,000 cu. ft.) is mixed with a reservoir fluid containing 2.1 gal. of butanes and heavier components per 1,000 cu. ft. of gas, the dew-point pressures of the fluid at reservoir temperature and at other temperatures common in production practice would be reduced. This gas contained less than 0.2 gal. of hexanes and heavier components, and if part of these were removed before the gas was mixed with the reservoir fluid, the dew-point pressure of the mixture would be reduced still a greater amount.

The movement of dry gas through the formation where such gas is injected into the formation to maintain the reservoir pressure is an important engineering consideration. The dry gas moves outward through the formation from the injection well and pushes the reservoir fluid ahead of it in a manner determined by the location of the injection and withdrawal wells, gas injection and production rates, the characteristics of the formation, and the properties of the dry gas and the reservoir fluid. Lewis[10] has described the changes that occur in the composition of the gas and liquid phases of the fluid from producing wells as the formations in the vicinity of the wells are invaded by the dry gas. The changes do not occur abruptly and many months may pass before the reservoir fluid recovered from producing wells is so diluted with injected gas that it can no longer be processed economically for marketable liquid components.

Occurrence of Stratification

One of the causes of the mixing of injected gas and reservoir fluid is the stratification as to permeability that often occurs in the productive formation. The fluid in a stratum of high permeability usually will be displaced by injected gas before the gas can sweep the fluid from an adjacent stratum of lower permeability. The injected gas that reaches the producing well by flow through the stratum of high permeability then dilutes the reservoir fluid entering the well from the stratum of lower permeability. This dilution increases with time and causes gradual decreases in the richness of fluid recovered at the well head.

Another and perhaps less common cause of the mixing of injected gas and reservoir fluid is the "pocketing" of the reservoir fluid by zones of low permeability in the formation. These barriers prevent the reservoir fluid from being swept ahead uniformly by the encroaching dry gas, as would occur in a homogeneous formation. Thus, although the fluid on the upstream and downstream sides of these natural barriers is for the most part bypassed by the relatively dry gas, some of it is continually drawn into the moving gas stream. At first the reservoir fluid trapped at the barriers enriches the stream of injected gas considerably, but, as the quantity of fluid retained at the impermeable zones is diminished, the passing stream is less and less effective in re-

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moving it. The first injected gas to reach a producing well is mixed with appreciable quantities of reservoir fluid, and, as more gas is pumped through the formation past the pockets of reservoir fluid, the composition of the fluid from the withdrawal wells approaches the composition of the injected gas.

Frost[11] has shown that helium may be used to trace the movement of injected natural gas through the formation and to locate the impermeable zones that interfere with the uniform flow of reservoir fluid. For 13 days helium was added to natural gas being injected into the formation in such quantities that the helium content of the gas was 0.14 per cent.

Increased Helium Content

At the same time gas samples from surrounding oil and gas-producing wells were analyzed at regular intervals until marked increases in the helium content of the produced gas were observed. An increase in helium content from 0.001 to 0.005 per cent was common and increases from 0.001 to 0.050 per cent helium were observed at some wells. In this way the time interval required for injected gas to reach different wells in the formation could be determined, and from a study of data obtained at all the withdrawal wells the velocity of fluid movement and the directions of migration through the formation could be ascertained.

These studies of fluid movement in formations made possible by determining the changes in the fluid composition can be helpful in deciding on locations for additional wells in such positions that the reservoir may be more completely drained. A more promising benefit with regard to gas-condensate fluids is that information is provided for better designing the recovery systems for new reservoirs.

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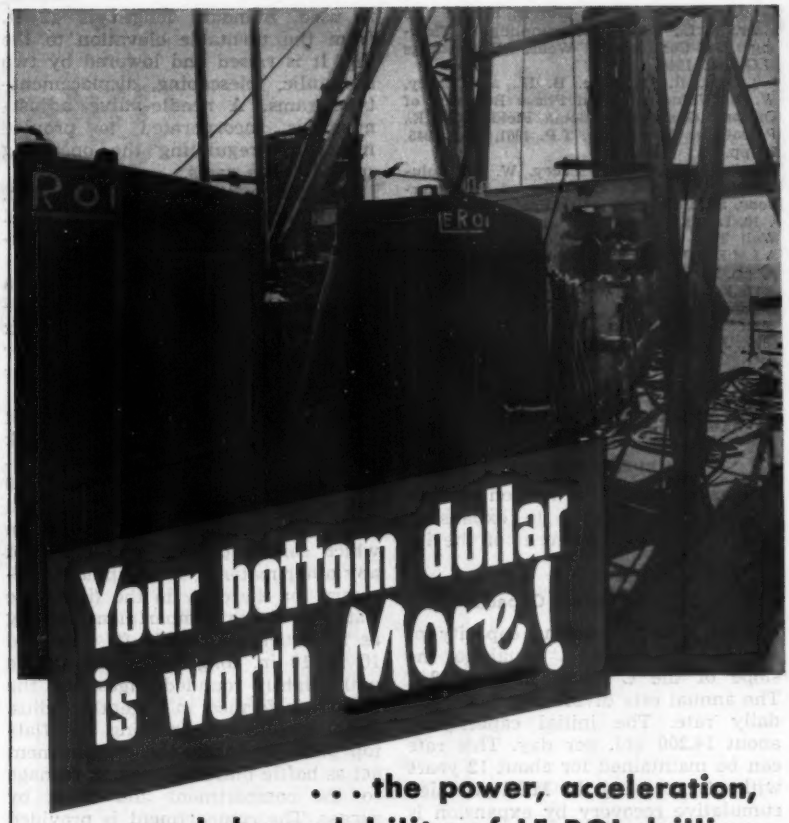

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A Radial Reservoir

(Continued from page 61)

expansion. About 5 million barrels of oil was allocated to expansion. This is about 2.5 per cent of the in-place oil.

Daily Producing Capacity

The annual producing capacity of the R-1 reservoir is equal to the slope of the C curve in Fig. 12-8. The annual rate divided by 365 is the daily rate. The initial capacity is about 14,200 bbl. per day. This rate can be maintained for about 12 years without exceeding the MER provided cumulative recovery by expansion is about 5 million barrels. The capacity declines down to about 8,000 bbl. per day during the interval between the twelfth and thirtieth years.

The Rate of Depletion

The rate of production is plotted against cumulative recovery in Fig. 12-9. The recoverable oil is (154 — C) million barrels at the time the cumulative recovery is C million barrels. The rate of depletion at any time is 365Q/(154 — C). Where Q is the daily reservoir capacity.

The R curve in Fig. 12-9 shows the rate of depletion if the R-1 reservoir were produced at MER. The initial rate of depletion is about 3.4 per cent per year. The rate of depletion increases up to about 13.3 per cent when the cumulative recovery is about 132,000 million barrels.

The location and spacing of producing and injection wells for the R-1 reservoir will be considered in the next article.

Mobile Rotary Drilling Unit Proves Efficient

(Continued from page 51)

one on each side of the turntable, and chains to an overhead yoke in the mast. Heavy-duty spring tighteners are incorporated to keep the pull down in position.

A new-type mast, constructed of steel tubing with a four-way taper, is used. Standard length is 22 ft. from the turntable elevation to the top. It is raised and lowered by two hydraulic, telescoping, displacement-type rams. A needle-valve adjustment is incorporated to provide means of regulating the operating speed of the rams.

Included in the rig is a 16-ft., 3-in. square kelly with a $1\frac{1}{16}$-in. bore. Either $2\frac{7}{8}$ or $2\frac{3}{8}$-in. drill pipe in 10-ft. joints may be used.

Auxiliary equipment includes a flood-lighting system utilizing an auxiliary battery of 150 amp. output, six flood lights and a 40-amp. generator driven by a V-belt off the power shaft.

As a companion to the drilling-unit truck, a dual-purpose water truck has been developed. The water compartment, having a capacity of 550 gal. as now designed, is built into and under the flat bed of the truck, on which can be carried drill pipe and any other material or equipment necessary for the crew in the field. The flat top of the compartment serving as the truck bed is $7\frac{1}{2}$ ft. wide and 10 ft. 10 in. long. Sides are square with slightly rounded edges, and the bottom is formed in a gentle radius. Cross members supporting the flat-top platform inside the compartment act as baffle plates to prevent damage to the compartment and truck by surges. The compartment is provided with a vacuum loading device, operated directly from the truck motor, which will fill the compartment in from 10 to 15 minutes. This eliminates need for a loading pump. Vacuum pull built up in the compartment during unloaded trips is sufficient to lift water 28 ft. at sea level or approximately 14 ft. at an elevation of 1 mile.

The drill was designed by D. D. Colquitt, manager of the Portadrill division of Winter-Weiss Co. O. C. Gossett is assistant manager of the division; August Goldstein, Jr., is geologist in charge of field work for contract drilling.

Petroleum Industry Scholarship Report

FOR the purpose of ascertaining the degree to which the petroleum industry supports research fellowships in American universities, and the subject and location of these fellowships, a questionnaire survey was conducted by the American Petroleum Institute at the request of several interested groups.

The results of this survey, which was limited to those organizations known to be most interested in the subject, are presented here in summary form. Although this report may be considered indicative it cannot be considered fully comprehensive, but it is believed to include at least 70 per cent of the fellowships supported by the petroleum industry.

The report shows that the 26 respondent companies now support or plan to establish a total of 211 fellowships in 48 universities and covering 42 subjects at an average annual cost of $2,550 per fellowship, or a total cost of $538,000 yearly. The distribution of these fellowships by subjects and by universities is shown in the report.

TABLE 1—ESTABLISHED AND PROPOSED FELLOWSHIPS SUPPORTED BY U. S. OIL COMPANIES

Total number of companies reporting	26
Number of companies supporting fellowships*	17
Total number of fellowships yearly	211
Total number of schools	48
Total cost	$538,094
Average annual cost per student (estimate)†	2,550
Total number of subjects	42
Total grades	211
Number of doctorates	144
Number of post doctorates	1
Unclassified grades	66
Total established and proposed	211
Number established	197
Number proposed	14

*This report covers fellowships only. Undergraduate scholarships and contributions to universities are not given. †A number of companies grant certain funds which might be classed as research grants for special purposes. These grants, which are included in the total cost, provide for fellowships as well as for the pursuit of a particular project. The average cost per student will depend upon the relationship and extent of the grant.

TABLE 2—ESTABLISHED AND PROPOSED FELLOWSHIPS SUPPORTED BY U. S. OIL COMPANIES

Subjects—	Number of students
Chemistry	20
Chemical engineering	17
Industrial relations	16
Chemistry and physics of petroleum	11
Engineering	9
Geology	7
Civil engineering	5
International affairs	5
Medicine	5
Petroleum engineering	4
Mechanical engineering	4
Physics	3
Business administration	2
Electronics	2
Effects of refinery wastes on fish	2
Marketing and management	1
Geophysics	1
Accounting	1
Ceramics	1
Surface phenomena	1
Physical chemistry	1
Lubrication fundamentals	1
Hydrocarbon reactions	1
Thiophene chemistry	1
Electrical engineering	1
Catalyst research	1
Alkylation research	1
Nuclear physics	1
Heat flow	1
Heat exchangers	1
Petroleum research	1
Fluid technique	1
Polymerization catalyst	1
Agricultural research	1
Hydrocarbon research*	66
Unclassified	14
Total	210

*General classification covering wide field of research on properties of hydrocarbon behavior.

MODERN Rotary DRILLING

Location Layout

STANDARD location layout of a large modern steam rig, is shown in Fig. 2.[1]

Worked out in detail, with considerable thought for efficiency of the arrangement, the layout shows all the advantages of such a standardization. With the distances between pits, pumps, engine, and boilers identical at each location, all connections, suctions, jets, etc., are standard. Unloaded at the proper points of the location, they may be quickly placed in position. Connection of a few unions makes them ready for operation.

The layout shows the present trend toward placing "in line" of heavy machinery, engine, pumps, and boilers. This is in contrast to the old established practice of placing the pumps at the side of the derrick. The new arrangement has considerable merit. Heavy pumps may be unloaded and skidded into position from the roadway. There is ample working space around the pumps and also around the derrick. Should a blowout or fire necessitate dragging the equipment away from the well, the arrangement makes the task easier.

Reference

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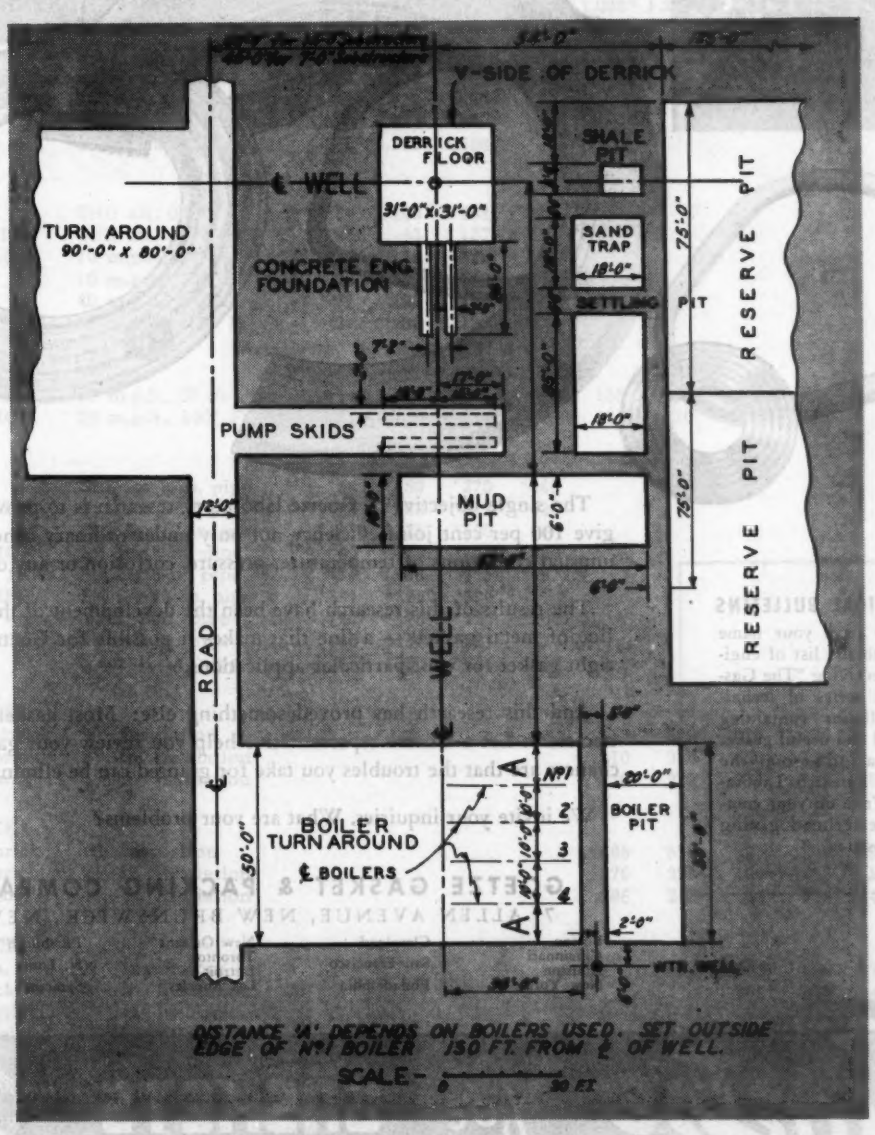

Fig. 2—Standard location layout for a large steam rig

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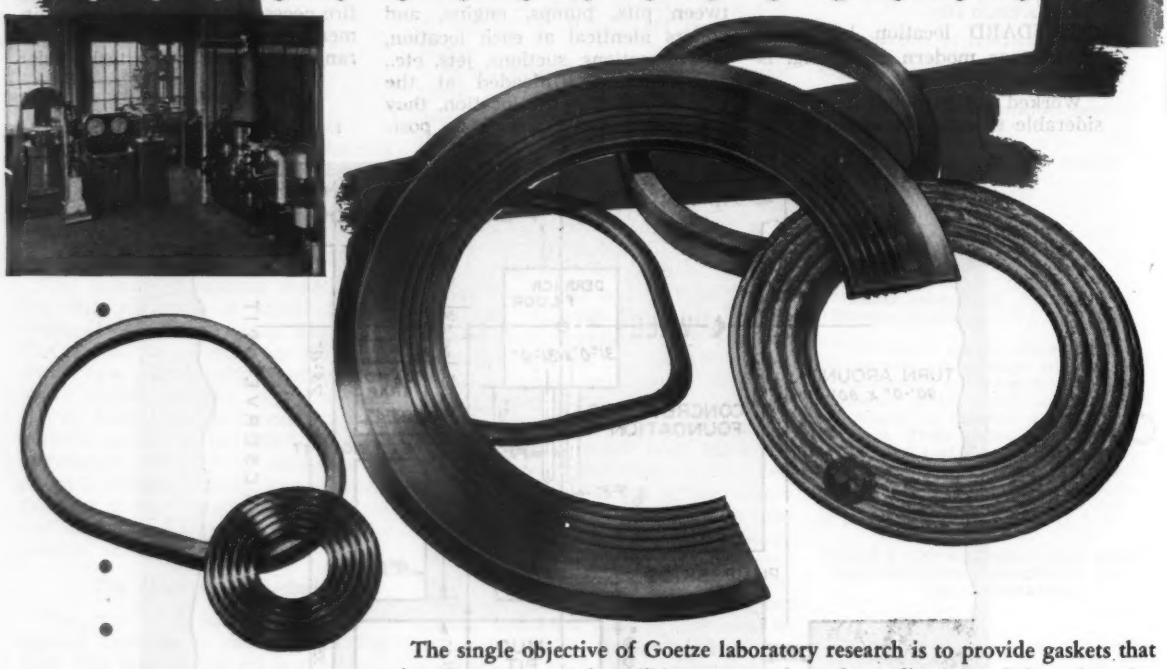

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Equipment Heat Losses

(B.t.u. per hour per square foot)

Wall	Conditions	Temperature inside equipment 200°	400°	600°	800°	1,000°	1,200°	1,500°	1,800°	2,100°	2,500°
	Still air, 0° F.	540	1,560	3,120	....	....	....	....	....	....	....
BARE METAL	Still air, 100° F.	210	990	2,250	....	....	....	....	....	....	....
(Breeching)	10 m.p.h., 0° F.	1,010	2,540	4,680	....	....	....	....	....	....	....
(Stacks)	10 m.p.h., 100° F.	440	1,710	3,500	....	....	....	....	....	....	....
(Pipe)	40 m.p.h., 0° F.	1,620	4,120	7,440	....	....	....	....	....	....	....
	40 m.p.h., 100° F.	700	2,760	5,650	....	....	....	....	....	....	....
	Still air, 0° F.	54	108	164	220	....	....	....	....	....	....
1½-IN. MAGNESIA	Still air, 100° F.	28	83	137	192	....	....	....	....	....	....
INSULATION	10 m.p.h., 0° F.	59	118	178	239	....	....	....	....	....	....
(Vessels)	10 m.p.h., 100° F.	30	89	149	210	....	....	....	....	....	....
(Towers)	40 m.p.h., 0° F.	61	122	183	246	....	....	....	....	....	....
	40 m.p.h., 100° F.	31	92	153	215	....	....	....	....	....	....
3-IN. MAGNESIA INSULATION	20 m.p.h., 0° F.	....	62	93	124	155	186	....	....	....	....
	20 m.p.h., 100° F.	....	46	77	108	139	170	....	....	....	....
	Std. for 3-in. pipe	*50	*150	*270	*440	....	....	....	....	....	....
MAGNESIA	Std. for 6-in. pipe	*77	*232	*417	*620	....	....	....	....	....	....
PIPE	Std. for 12-in. pipe	*111	*325	*590	....	....	....	....	....	....	....
INSULATION	1½ for 3-in. pipe	*40	*115	*207	*330	....	....	....	....	....	....
(Loss per foot	1½ for 6-in. pipe	*64	*186	*335	*497	....	....	....	....	....	....
of length)	1½ for 12-in. pipe	*111	*325	*590	....	....	....	....	....	....	....
(80° F. air tem-	3 for 3-in. pipe	*24	*75	*135	*200	....	....	....	....	....	....
perature)	3 for 6-in. pipe	*40	*116	*207	*322	....	....	....	....	....	....
	3 for 12-in. pipe	*65	*190	*346	*518	....	....	....	....	....	....
FURNACE†											
4½-in. Firebrick	No insulation	....	....	....	....	647	800	1,010	1,220	....	....
4-in. Redbrick	2½-in. insulation	....	....	....	....	310	380	500	630	....	....
(100° F. air)	4½-in. insulation	....	....	....	....	230	272	352	448	540	....
FURNACE†											
9-in. Firebrick	No insulation	....	....	....	....	485	570	693	790	833	....
4-in. Redbrick	2½-in. insulation	....	....	....	....	276	328	400	467	527	607
(100° F. air)	4½-in. insulation	....	....	....	....	206	247	306	359	409	470
FURNACE†											
13½-in. Firebrick	No insulation	....	....	....	....	....	....	583	668	715	793
	2½-in. insulation	....	....	....	....	....	....	369	425	475	541
4-in. Redbrick	4½-in. insulation	....	....	....	....	....	....	276	314	383	445
(100° F. air)	9-in. insulation	....	....	....	....	....	....	198	230	254	288

*Heat loss per foot of length rather than per sq. ft. of surface. †20 m.p.h. wind and 100° F. air temp.

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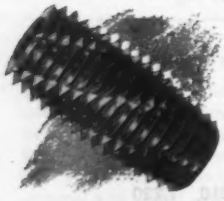

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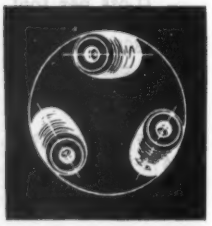

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ENGINEERING *fundamentals*

Scale and Corrosion Control in Cooling-Water Systems

THE prevention of scale and corrosion plays a role of major importance in the proper maintenance of cooling-water systems. Each year millions of dollars are spent for cleaning and replacements of condensers, heat exchangers, engine jackets, piping, and other expensive equipment.

The term cooling water is applied wherever water is circulated through equipment to absorb and carry away waste heat. A better understanding of the cause of scale and corrosion as well as the corrective methods required will be possible with a brief discussion of the basic design of the more important cooling-water systems.

Cooling-water systems can be classed in the following manner:

1. Once-through systems.
2. Open circulating systems.
3. Closed circulating systems.

Once-Through Systems

The type scale encountered in a once-through system is almost invariably chiefly calcium carbonate from the decomposition of calcium bicarbonate. In special cases and primarily with the use of well waters possessing a high natural-iron content, deposition of iron oxide from the decomposition of ferrous bicarbonate takes place. In once-through systems, corrosion results primarily from the presence of dissolved oxygen, carbon-dioxide, and low pH values.

The factors affecting scale formation are temperature, rate of heat transfer, calcium, magnesium, silica, sulfate, and alkalinity concentrations, and more pertinent—pH value. In a once-through system the magnesium, silica, and sulfate concentrations are normally sufficiently low so that these factors do not enter the problem. The other factors, however, do apply in this type system.

By means of Langelier's equations, which take into consideration pH, calcium, total alkalinity, dissolved solids and temperature, it is possible to predict with a remarkable degree of accuracy whether a water is scale forming with respect to calcium carbonate.

Prevention of scale formation in once-through systems is primarily based on adjustment of the water balances in keeping with Langelier's equation, the application of materials possessing surface active properties or a combination of the two.

In once-through systems, corrosion is primarily the result of dissolved oxygen and low pH values. Where a water possesses a negative saturation index, as calculated by Langelier's equation, no calcium carbonate deposit will form over the metal surfaces, and the dissolved gases will be free to attack the metal. The correction of this condition depends on rendering the water over-saturated with respect to calcium carbonate, to permit deposition of a thin protective film over the metal surfaces. The deposition must be evenly distributed over the entire metal surface so as to prevent the dissolved gases from attacking the metal. The materials commonly used for this purpose are soda ash, lime and caustic soda. They serve to neutralize the free acidity or carbon dioxide, and as a result increase the alkalinity and pH value. Lime not only increases the pH and alkalinity but the calcium content of the water.

To assure the maintenance of a protective film on the metal surface at the point of lowest temperature, it is necessary to maintain an over-saturated condition at the lowest temperature. Therefore, while a small amount of deposit will result at the lower temperature, a large amount will result at the higher temperature. Where the difference between maximum and minimum temperature in the system is large, an undesirable amount of scale will deposit at the higher temperature. Since this corresponds to the point at which heat transfer is taking place, serious interference with rate of heat transfer will result. Therefore, in addition to rendering the water over-saturated, surface-active treatment must be employed to control the deposition.

This material is from the Betz Handbook for Industrial Water Conditioning, written and published by W. H. and L. D. Betz, consulting engineers, Philadelphia.

Open Circulating Systems

In the open circulating system, water flows through the heat-exchange equipment and absorbs heat and as a result has its temperature increased. It then flows to water-cooling equipment where the water in turn is cooled. The cooled water is then pumped back through the heat-exchange equipment and the cycle is repeated.

In the circulation systems where the water is concentrated by evaporation, the problem of scale formation becomes more difficult. Not only is the tendency toward calcium carbonate scale formation greater, but the problem is intensified by the necessity to avoid exceeding the solubility of calcium and magnesium silicates and calcium sulfate.

The type treatments required to prevent scale formation in open circulating systems are similar to those employed in the once-through type system. However, quantities of treatment required are considerably higher, ranging in the neighborhood of 30 to 100 p.p.m. on the basis of the circulating water. The surface-active materials employed should be a definite blend best suited to the characteristics of the water encountered.

When the system of maintaining a protective deposit formation cannot be satisfactorily applied, protection against corrosion can be brought about by use of chemicals which possess the property of rendering the metal surfaces passive.

Closed Circulating Systems

Due to the lack of concentration, the problem of scale formation in this type system is not great, except in the case where extremely hard waters are used for make-up. Generally, corrosion is the main problem. Because of the small amount of makeup normally required, the use of softened water or condensate is economically permissible.

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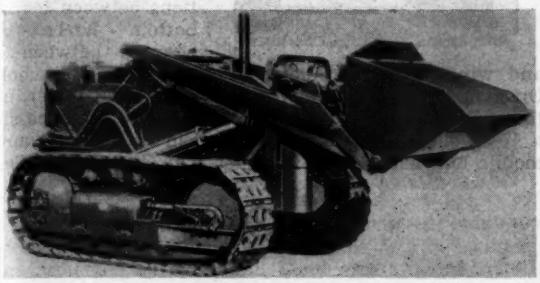

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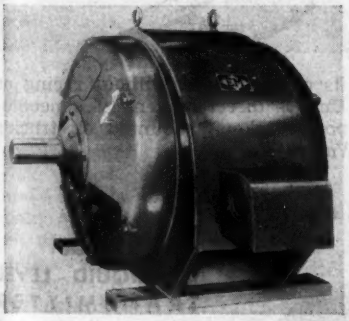

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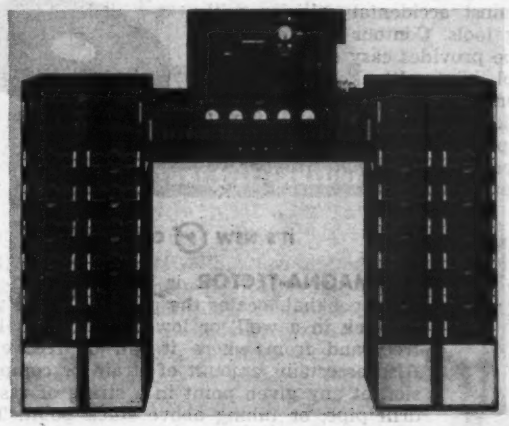

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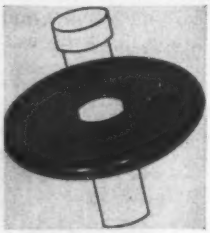
OIL AND GAS EQUIPMENT Digest — IT'S NEW CHECK IT

(4) NEW SOLENOID VALVE for small-capacity flows of oil, gas, water, air, etc., can be mounted quickly through screw holes, and electrical connections can be made easily by utilizing one of three knockouts in outlet box. Coil is removed and replaced without disturbing electrical connections to thermostat or other electrical devices. Efficient magnetic circuit provides low current consumption and "floating plunger" insures quiet operation. *Henry Valve Co.*

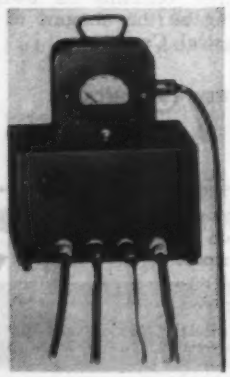
IT'S NEW CHECK IT

(5) SYNTHETIC PIPE WIPER resists abrasion, oil, drilling mud, chemicals, and gas. Steel reinforcing ring protects wiper against accidental collision with rig tools. Contour ring engaging pipe provides easy stripping over tool joints. Blanked-out depressions can be converted into peep holes by cutting bottoms. Each wiper is built to fit correct size pipe. *International Rubber & Plastics Co.*

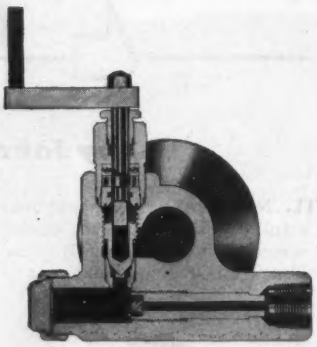


IT'S NEW CHECK IT

(6) MAGNA-TECTOR is an electronic oil-well tool that locates the point at which pipe is stuck in a well, or lowest point that it is free, and from where it can be recovered. Also ascertains amount of strain or compression at any given point in a string of casing, drill pipe, or tubing above stuck point. Tool is run into well on regular electric conductor cable used for gun perforating, and when a point is reached where a test is to be made an electric current energizes two magnets, one of which is located at each end of tool. When energized, magnets cling to side wall of pipe and serve as anchors to hold the whole assembly in a fixed position relative to pipe. When pipe is pulled upward, with sufficient strain to cause it to stretch or flex, magnets are moved further apart by reason of elongation of pipe between the magnets. A sensitive electronic device, located near center of tool in combination with a telescopic joint, transmits amount of stretch to surface where it is indicated on a gage. If pipe is stuck or rigidly held against stress or elongation at point which tool is located, no indication will exist as there is no elongation of pipe. *McCullough Tool Co.*



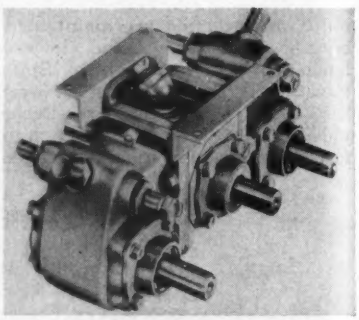
IT'S NEW CHECK IT



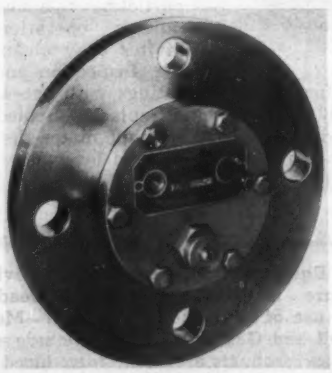
(7) FLOW-CONTROL UNIT combines in an integral, one-piece casting a device performing the functions of a christmas-tree cross or tee, wing valve, adjustable or positive choke, and the upper bottom-hole-pressure-connection adapter. Eliminates flanged connections between tee and bottom-hole-test adapter, between tee and wing valve, and between wing valve and choke. Opening through the valve seat is 1 in. in diameter, and the unit is adapted to flow volumes up to those passing a ¾-in. choke. Unit can be hauled in an ordinary automobile and handled by two men. *Oil Center Tool Co.*

IT'S NEW CHECK IT

(8) NEW POWER DIVIDER simplifies driving of two independent pumps on tank trucks, etc. Pumps can be operated simultaneously or independently as required. Also available with a third shift extension for driving hose reels or other equipment. Divider drives pump at its correct speed without racing or lugging the engine. Unit is direct driven by a needle-bearing shaft from power takeoff mounted on truck's transmission. *H. S. Watson Co.*



IT'S NEW CHECK IT

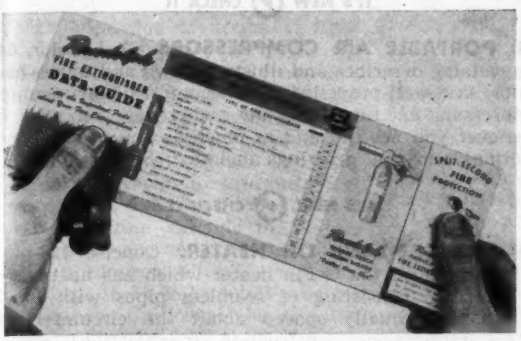


(9) LIQUID-LEVEL TRANSMITTER measures the level of liquid in a tank and transmits an air pressure proportional to this level to a remotely located instrument. Unit measures level of viscous liquids or liquids with solids in suspension, level of liquids or solutions which solidify in the usual pressure or manometer connections, and relatively low-pressure corrosive gases or liquids. Device consists of a metal dia-

phragm in a 3-in. 150-psi. stainless-steel flange which is attached to bottom or side of an open or vented tank. Operates on the force-balance principle. *Taylor Instrument Companies.*

IT'S NEW CHECK IT

(10) FIRE DATA GUIDE presents important facts about the suitability, maintenance, and performance of soda-acid, foam, pump-tank, dry-powder, loaded-stream, carbon tetrachloride, and carbon dioxide fire extinguishers. Reverse side of Data Guide tells, in relation to plant fire



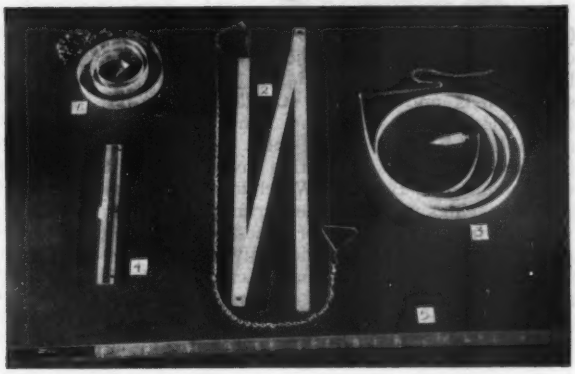
hazards, how high units should be bracketed, maximum distances of the extinguishers from the operator, and the area protected by each unit. Condenses 222 fire facts in handy slide chart. *Randolph Laboratories, Inc.*

IT'S NEW CHECK IT

(11) GIANT ROTARY DRILLING RIG is mounted on all-wheel-drive truck which is over 45 ft. in length. Includes draw works, two-engine power plant, two slush pumps, propeller-shaft rotary table, and a 90-ft., 200,000-lb.-capacity telescoping derrick. Truck engine and auxiliary engine, both of which may be used for driving unit over road and for operating rig, are diesels and will produce in excess of 350 hp. Designed to telescope to a length of 60 ft. when in the over-the-road position, derrick is raised and lowered by means of a power-screw raising device operated by power of the truck engine. *Franks Manufacturing Corp.*

IT'S NEW CHECK IT

(12) SIMPLE PLASTIC GAGES give quick, accurate reading of fuel-oil tanks. All have frosted surfaces which turn clear when wet, thereby showing a clean, distinct indication of the quantity of oil on hand. Illustration includes (1) a gage for 550-gal. outdoor tank (similar gages are available for underground tanks holding up to 10,000 gal.); (2) a 6-ft. folding gage for use by fuel-oil delivery men; (3) a gage for small bulk tanks; (4) a gage rule which fits over a regular steel gage tape for large bulk measurements, and (5) a gage for 55-gal. drums, with calibrations for both vertical and horizontal



measurements. Items 1 and 3 are made of Plastacele cellulose acetate plastic, the others of Lucite acrylic resin. *E. I. du Pont de Nemours & Co., Inc.*

IT'S NEW CHECK IT

TRADE LITERATURE

(13) SPRING HANGERS. New 32-page, 4 color catalog describes proper method of installing supports to carry the dead weight of pipe, eliminate vibration, absorb shock, and control the movements. Isometric color drawings and photographs illustrate uses of functional spring hangers and vibration eliminators. *Blaw-Knox Co.*

IT'S NEW CHECK IT

(14) VAPOR SAVING ROOFS. An eight-page bulletin fully describes the expansion roof and improved floating roof of the double-deck construction. Gives graphs and information on the conservation of petroleum products in storage. *Graver Tank & Manufacturing Co., Inc.*

IT'S NEW CHECK IT

(15) PUMP GOVERNORS. Contents of 15-page bulletin include selection of proper pump governor for the job; pump governors for reciprocating and turbine-driven pumps; ordering, sensitivity, and sizing obsolete pump governors; maintenance; and installation and operation. Capacity table and 16 illustrations accompany descriptions. *Leslie Co.*

IT'S NEW CHECK IT

(16) EXHAUST FANS. New 12-page bulletin on corrosion-resistant fans for exhausting acid and other corrosive fumes gives complete engineering data including

dimensions and capacities of five standard-size fans. Booklet points out that alloy used in constructing each unit depends upon the type of corrosive service it will encounter. Typical applications in drawings include exhausting fumes from laboratory hoods, plating, pickling, and anodizing tanks, hydrochloric acid etching installations, reaction kettles, sulfuric acid chamber processes, absorption or drying towers, Kjeldahl tubes, fume washers, etc. *The Duriron Co., Inc.*

IT'S NEW ✓ CHECK IT

(17) METALLIC PACKING. New two-color illustrated catalog shows in detail major items in metallic packing line. Conveniently tab indexed in two sections. First section lists and displays standard piston-rod packing assemblies, valve-stem and tandem-style rod-packing assemblies, steam-pipe slip-joint assemblies, and packing accessories. Second section gives important information about the Bearing Watchdog system which "inspects bearings while engine is running." The Safe-N-Ezy valve-spring depressor for one-man dismantling and assembling of diesel-engine valves and the Bingham sleeving process for reclaiming crankshaft journals are also shown. *Paxton Diesel Engineering Co.*

IT'S NEW ✓ CHECK IT

(18) SEISMIC SURVEYS New series of loose-leaf color brochures present a complete line of seismograph equipment used in making precision seismic surveys. Description, illustrations, and specifications are given on the seismograph, recording truck, composing panel, test unit, oscillograph, seismometers, amplifier, power panel, and radio. Provides informative material for all interested in geophysical exploration. Concise, complete. *National Geophysical Co., Inc.*

IT'S NEW ✓ CHECK IT

(19) OIL-WELL PUMPS. New 16-page bulletin has 14 explosion photographs and two blueprints showing the features of type D-21 unit pumper. Complete specifications for 16 possible combinations of elements of pumper are given. *The National Supply Co.*

IT'S NEW ✓ CHECK IT

(20) COPPER-BASE ALLOYS. A comprehensive compilation of welding and composition information relating to copper-base alloys is set forth in 19 mimeographed sheets. List gives trade names, manufacturers, and chemical composition of copper-base alloys together with information on degree of weldability, preheats, type of electrodes or rods recommended, and preferred welding process. *Ampco Metal, Inc.*

IT'S NEW ✓ CHECK IT

(21) OIL-WELL PUMP ACCESSORIES. Complete line of equipment for pumps and miscellaneous pumping-well specialties covered in 26-page multicolored bulletin. Includes description and specifications of rig-iron crank-arm equipment. Adaptable for loose-leaf binding. *Baird Manufacturing Co.*

IT'S NEW ✓ CHECK IT

(22) PUMPING AND DRILLING ENGINES. Engine equipment for petroleum operations is described in new 17-page bulletin. Generously illustrated with field photographs of applications in pipe-line booster stations, recyling plants, and on drilling rigs. Engine test code survey-sheet reproductions and fold-out installation dimensions given. *Hall-Scott Motor Car Co.*

IT'S NEW ✓ CHECK IT

(23) PORTABLE AIR COMPRESSORS. A 4-color, 44-page catalog describes and illustrates two and four-wheel trailor, skid, self-propelled crawler, and rail-car-mounted compressors for furnishing air "wherever you need it, whenever you need it, and as much as you need." Specifications and line drawings included. *Schramm Inc.*

IT'S NEW ✓ CHECK IT

(24) STORAGE-TANK OIL HEATER. Concise 12-page bulletin features the G-Fin heater which has heat-transfer elements consisting of seamless pipes with longitudinal fins equally spaced about the circumference. Covers applications, construction, specifications, advantages, installation, dimensions, and ratings. Line drawings and photographs illustrate units. Adaptable for ring-binding. *The Griscom-Russell Co.*

IT'S NEW ✓ CHECK IT

(25) ELECTRICAL DEVELOPMENTS OF 1946. Review of some of the year's developments, including not only electrical but also in mechanical, chemical, and allied fields. Indicates the trend in design and construction as well as the general progress in industry as a whole. Of interest to all readers. *General Electric Co.*

IT'S NEW ✓ CHECK IT

(26) FLEXIBLE COUPLINGS. Complete list of flexible couplings for every use and load presented in handy 57-page, loose-leaf engineering catalog. Complete with index to coupling specifications, photographs and cutaway drawings, and dimensions and service-factor tables. *Thomas Flexible Coupling Co.*

IT'S NEW ✓ CHECK IT

(27) OIL AND GAS SEPARATORS. New 20-page catalog treats separators and accessories for high and low-pressure separators, metering installations, valves, back-pressure regulators, pilots and panels, and gage glasses and cocks. Illustrated with photographs and schematic drawings. *Maloney-Crawford Tank & Manufacturing Co.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

PIPE LINES

Pipe Laying Starts for El Paso's Tex.-Calif. Line

WITH pipe due to arrive at Casa Grande, Ariz., January 28, laying operations are scheduled to commence February 1 for El Paso Natural Gas Co.'s Texas-California 988-mile 26-in. line. In recent weeks a gang of the company has been engaged in laying a gathering system to transmit West Texas gas to Eunice, N. Mex. From Eunice the line extends to Blythe, Calif., near the Arizona boundary where it connects with 214 miles of 30-in. pipe to be laid to Los Angeles for Southern California Gas Co. and Southern Counties Gas Co.

The first pipe laying for the 26-in. line will be at the western 238-mile section from Tuscon, Ariz., to Blythe, which has been contracted by Mid-west Constructors. Operations of the contractor are conducted from a camp established near Casa Grande at the middle of the section. Pipe laying will begin near Casa Grande. The spread is supervised by M. T. Wilhite.

The El Paso Natural Gas organization will put two spreads on the line within the next 2 months, according to C. L. Perkins, general superintendent. During the last week in February one spread will start from headquarters at El Paso, Tex., on a 210-mile section. In the middle of March the other spread will begin near Guadalupe, south of Carlsbad, N. M., on a 200-mile section. When gathering-line construction is completed, the men and equipment now engaged on it will be moved to lay 110 miles between Eunice and Guadalupe. El Paso company crews are building five compressor stations: two near Eunice and one at each of the following points—Kermit, Tex.; Fullerton, Tex., and Jal, N. M.

Electric welding will be used at the outset; in May it is expected that pressure welding will be used on the line. All pipe is coated and wrapped. Pipe is supplied to the El Paso company by National Tube Co., A. O. Smith Corp., and Consolidated Steel Corp.

H. C. Price Co. has laid canal crossings for the 214-mile, 30-in. section west of Blythe for the California gas companies. During the first week in February this contractor expects to start laying 30-in. on the main line. All of the 30-in. comes from Consolidated Steel Corp.; more than 50 miles of 30-in. pipe has been delivered to the project; Consolidated is producing this diameter pipe at the rate of a mile per day.

Pipe Lines Move One-Ninth Of U. S. Freight Tonnage

One-ninth of all the freight tonnage moved in the United States travels over the nation's 140,000-mile network of petroleum pipe lines, according to an article in the current issue of the Lamp, publication of Standard Oil Co. (N. J.)

The Lamp article points out the nation's oil production of some 4,750,000 bbl. daily from 421,000 wells in 24 states all leaves the well by pipe line, though not all of it reaches the refinery by this means. The nation's 411 active refineries scattered over 36 states receive about 77 per cent, or more than 3,500,000 bbl. daily, of their domestic crude supply by pipe line with the remainder deliv-

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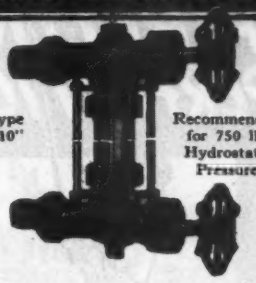
PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



Steel construction throughout with stainless steel interior trim. Automatic shut-off is positive and instantaneous; stainless steel balls shut off the flow of liquid when glass breaks. Heavy duty stuffing boxes, union connections, offset construction facilitate cleaning and simplify glass replacement. Conform with A.P.I.—A.S.M.E. requirements.
This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

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GENERAL PIPELINE CONTRACTING
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Pipe Line Supplies and Equipment

Parson's Wheel Trenchliner

Greater profits through speed in completion of contracts with the Trenchliner. Outstanding performance on tough jobs—clay, gumbo, shale, or compacted sand. The Trenchliner, with the latest improvements, assures you of the greatest speed of operation in all soil conditions.

The Clarence L. Boyd Co., Inc.
LD 725
Tulsa, Oklahoma

ered to waterside refineries by tankers and barges.

Petroleum pipe lines, the Lamp says, carry crude through a network of 125,000 miles. From the refineries, gasoline, kerosene, and fuel oil moves out through an additional 15,000 miles of lines to marketing areas.

Dr. Homer Holler to Study Corrosion for U. S. Bureau

Dr. Homer D. Holler, formerly with Westinghouse Electric Corp. and Phillips Petroleum Co., has joined the National Bureau of Standards and will initiate a new phase in the bureau's work on underground corrosion.

H. D. HOLLER

A bureau announcement said Holler, because of his wide experience in the field of electrochemistry, will undertake a program directed toward "more fundamental studies of underground corrosion utilizing data resulting from extensive studies involving the burying and later excavation of many thousand specimens of pipe of assorted materials and with various protective coatings."

The problem of the deterioration of underground metallic material has become critical with the sharp increase in the miles of underground gas, oil, and water pipe lines, the bureau added, and it is estimated losses due to such corrosion amount to $100,000,000 annually.

Holler, who will work with Dr. I. A. Denison of the underground - corrosion section of the bureau, has been responsible for corrosion investigation and control since 1929 for Westinghouse Electric. He directed studies in electrochemical and corrosion work during two former tours with the bureau, from 1915 to 1919 and from 1927 to 1929. Prior to joining the bureau in 1927, he was a member of Phillips' research staff where he investigated seismic methods of geophysical prospecting.

Aerial Survey Contracted for Michigan-Wisconsin Project

For an aerial survey of the route of Michigan-Wisconsin Pipe Line Co.'s 1,069-mile 22-26-in. line from Texas to Michigan, a contract has been awarded to Abrams Aerial Survey Co., Lansing, Mich.

Preparations are being made for flying the proposed route, according to E. L. Fischer, engineer-in-charge, United Light & Railways Service Co., Davenport, Iowa, who is handling engineering matters for the project at the present time. It is expected that work of aerial surveys, ground surveys, and the buying of right-of-way will be in progress for several months.

Ladewig Organizes for Pipe-Line Contracting

Ladewig Engineering Co. has been preparing to undertake the contracting of pipe lines by acquiring the construction equipment of J. W. France Co. The latter company, contrary to a previously published report, will continue as an organization operating the oil properties which it now possesses. The operations of the Ladewig company will be directed from Corpus Christi, Tex., by Herman Breitung, president. Vice presidents of the company are: C. A. Breitung, Smith Davis, and George Ralston; secretary is Robert H. Martin.

Briefs Ordered in State Suit to Tax Big Inch Lines

Pretrial briefs from both litigants have been ordered by Federal Judge Thomas C. Trimble in the $188,000 suit by the State of Arkansas against Reconstruction Corp.

The suit seeks a judgment for 1944 state taxes on the Big Inch lines. The suit was filed 9 months ago. Guy E. Williams, attorney general, asked that the case be decided as soon as possible since the 21 counties traversed by the lines are eager to determine whether they will receive benefits from the tax.

Humble Building 43-Mile, 10,000-Bbl. Daily Crude Line

Construction of a 43-mile, 6-in. crude pipe line is under way by Humble Pipe Line Co. between Pittsburg field in Camp County, Tex., and the company's station at Longview.

The new line will carry 10,000 bbl. daily and is designed to facilitate gathering at New Hope, Pickton, and Pittsburg fields. A pump station will be built at Pittsburg.

C. S. FOREMAN COMPANY
General Contractors
PIPE LINES
1221 Baltimore
Kansas City 6, Missouri

REFINING

Effect of Low Pressures On Motor Fuel Described

Results of research studies in the inflammability of internal-combustion motor fuels at reduced pressures, such as those encountered in high-altitude aviation, are contained in a report issued by the Bureau of Mines.

The report, prepared by G. W. Jones, supervising chemist of the bureau's gaseous-explosions section, and I. Spolan, scientific assistant, declares the inflammability of mixtures used was not substantially affected until the pressure had been reduced to approximately one-fourth of the normal atmosphere.

Rogers Lacy Refinery Work Under Way Again

MARSHALL, Tex.—Barring further materials shortages, work on the Rogers Lacy refinery near Big Sandy and Hawkins field, is expected to be completed within 3 months. Work resumed recently following a 2-month layoff due to a lack of materials. The refinery was started a year ago.

Russians Pushing Engine-Fuel Research

A very extensive program of research on engine fuels, especially aviation fuels, is under way by Russian scientists, according to Russian Technical News. Sixty hydrocarbons have been synthesized by A. D. Petrov, all being in the molecular-weight range higher than 10 carbon atoms.

Petrov is reported to have found that there is a good possibility that hydrocarbons of the C_{20}-C_{28} molecular weights may make a "superior" aviation gasoline. Petrov also finds that in the C_{13}-C_{16} range antiknock properties increase with the decrease in the number of lateral side chains, and that above the C_{18} range only monoalkylbenzenes possess antiknock properties.

E. Adirovich has developed a theory of the mechanism of knock which varies somewhat from the conventional idea. He states, according to the News translation-abstract, that the organic radicals in TEL which prevent the "lead from interacting with the peroxides favor the accumulation of unstable oxidation products in the unburnt part of the charge, thereby facilitating the occurrence of detonation." Thermal stability and not chemical properties are the basic factors governing detonation tendencies, he says. Adirovich formulated a mathematical equation which relates reactibility with lead with sulfur concentration in the fuel.

Atomic Research Opens New Lubricant Field

PITTSBURGH. — An entirely new field of lubricants, solvents, and plastics has been developed during the progress of the atomic-bomb research at Oak Ridge, Tenn., according to Dr. Manson Benedict, director of development for Hydrocarbon Research, Inc.

These products are made chiefly from fluorine and carbon, he said, and were used to protect equipment and materials used in the gaseous-diffusion process which separates Uranium 238 from the fissionable Uranium 235 used in atomic bombs.

ECOLITE 92BM

WITH LOCKING DEVICE AND SEALS

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APPROVED BY U. S. BUREAU OF MINES UNDERWRITERS' LABORATORIES

—for use in atmospheres containing Methane or natural gas, gasoline or petroleum vapors. This double-safety lantern has a tamper-proof reflector and cover with locking device and seals. Throws 1500 ft. beam. Instantly ejects broken bulbs from battery circuit. Large handle — 360° pivoting feature gives direct illumination where needed and leaves both hands free for work.

Now at Supply Stores

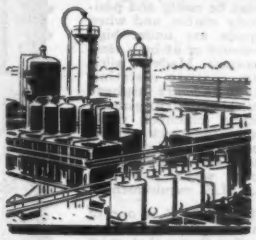
ECONOMY ELECTRIC LANTERN CO.

3100 W. CHERRY ST. MILWAUKEE 8, WIS.

PETRECO

Planned Protection

ELIMINATES SALT BEFORE IT CAN DO ANY HARM



PETRECO *Electric* DESALTERS in refineries everywhere are automatically reducing residual salt to less than 10 pounds per thousand barrels. With but few exceptions, they are showing removal percentages over 90. Some of the *high-capacity* PETRECO UNITS are just under 100% efficient.

PETRECO Electric DESALTING is *planned* to increase refining profits. Salt is eliminated before it causes plugging, corrosion, and coking. Result: less down-time and *more continuous on-stream time.*

Plan with PETRECO for profitable desalting. . . . Write or consult your nearest Petreco Engineer today!

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LIQUID LEVEL GAGES

Liquid always shows black—empty space shows white. Preferred where the liquid level must be easily and positively visible, and when liquids are under high pressure or at high temperature. Made of alloy temperature resisting steel and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Reflex" is one of the complete line of Penberthy Gages that meet every liquid level gage requirement.

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It was necessary to work with uranium-fluorine compounds which hydrolyze so readily with water or organic materials that extreme precautions were necessary to keep both materials out of the system. The gaseous-diffusion system employed in this case has only limited application in other fields, Dr. Benedict said, and this uranium separation may be the only practicable application due to the extremely high cost of the operation.

Other important developments discussed before the thirteenth annual chemical-engineering symposium of the American Chemical Society are advances in vacuum engineering; a continuous mass spectrometer, vacuum-tight valves, design of high-ratio centrifugal compressors, and methods for application of internal coatings of nickel to steel pipe.

W.P.R.A. Plans Program For San Antonio Meeting

Papers on petro-chemicals, Fischer-Tropsch synthesis, octane requirements of automotive engines, and catalytic cracking will highlight technical sessions at the thirty-fifth annual meeting of the Western Petroleum Refiners Association, March 24-26 in the Plaza Hotel, San Antonio.

The technical sessions, under the planning of the association's manufacturing committee, will be held the mornings of March 25 and 26.

John L. McCaffrey, president of International Harvester Co., and Beauford H. Jester, governor of Texas, will appear during the general sessions.

Standard Combustion Comparator Developed

A standard means of determining the burning qualities of fuel oils is provided by the construction of the first combustion comparator, to be known as the combustion-reference test unit.

Development of the instrument was announced following the quarterly meeting in New York of the board of directors of the Oil-Heat Institute of America, which sponsored the work.

Ballots to Determine Specification Changes

WASHINGTON.—Changes in specifications of petroleum and petroleum products will be determined by mailed ballots in the near future by the American Society for Testing Materials.

The balloting will be on papers recommending changes which were submitted at the society's recent meeting here by about 25 subcommittees of Committee D-2. Recommendations will not be made public until a decision on the changes is made, according to Dr. C. Dansizer, General Electric Co., chairman.

Liquid Oxygen Boosts Aircraft-Engine Power

WASHINGTON.—Increases in power output of aviation engines up to 400 hp. have been obtained in experimental flights by introducing liquid oxygen into the fuel-air mixture at high altitudes, according to results reported by the U. S. Bureau of Standards' aircraft-engines section, under E. F. Fiock. At 28,000 ft. elevation this gave increased plane speeds of nearly 400 m.p.h., with slight decrease in specific fuel consumption. At 35,000 ft. elevation speed was increased 15 m.p.h. and power output raised by 200 hp., by injecting liquid oxygen.

Temperatures are higher when operating with liquid oxygen than when using only air, due to the diluting and cooling effect of the inert nitrogen of the air introduced. These higher temperatures approach the limiting temperatures for safe operation, and the decision is that oxygen shall not be used at elevations where the engine delivers its maximum power with air alone. Total concentration of oxygen should not exceed about 29 per cent in the inducted charge, it has been found.

Pennsylvania Railroad Switching to Diesels

A $30,400,000 program to replace its through-service fleet of coal-burning engines with diesel-electric locomotives has been announced by Pennsylvania Railroad Co.

Earlier Chicago, Indianapolis & Louisville Railway Co. announced receipt of six new diesel freight locomotives as a part of its program for complete dieselization. The program, to cost about $13,000,000, is expected to reduce fuel costs by 48 per cent and repair costs by 60 per cent, according to a study recently made at the request of John W. Barringer, Jr., president.

WAA Offers Plant Site

A partly developed plant site suitable for the establishment of a chemical plant and located 5 miles west of Lake Charles, La., is being offered for sale by War Assets Administration. The 163-acre site was acquired in 1945 for a wartime toluene plant. Improvements costing $315,000 had been made when the project was concelled following the end of hostilities.

NATURAL GAS

United Fuel Gas Proposes $2,970,000 Improvements

WASHINGTON.—United Fuel Gas Co., Charleston, W. Va., has filed with the Federal Power Commission a request for authorization to construct and operate additional facilities in West Virginia to increase by approximately 41,000,000 cu. ft. per day the capacity of its existing facilities for delivery of natural gas to the Pittsburgh group of the Columbia Gas & Electric Corp. system. Cost was estimated at $2,970,000.

The company's plans include construction and operation of approximately 70 miles of 20-in. gas-transmission lines in West Virginia in Roane, Calhoun, Gilmer, Doddridge and Wetzel counties. These lines would connect portions of a 16-in. line recently authorized for construction, and would complete a single high-pressure transmission line extending from the Cobb compressor station in Roane County to a connection with the line of The Manufacturers Light & Heat Co. in Monongalia County, West Virginia. In addition the plans include construction of a measuring station on the transmission line and installation of six high-pressure compressor cylinders on three existing 1,000-hp. units at the Cobb compressor station. United Fuel is the largest company of the Charleston group of the Columbia system and is the major supplier to affiliated companies operating in Ohio, New York, Pennsylvania and Kentucky.

Mid-Continent Opposed In Request for Permit

WASHINGTON.—Northern Natural Gas Co. and Cities Service Gas Co. attorneys last week asked the Federal Power Commission to dismiss the application of Mid-Continent Gas Transmission Co. for authority to build pipe lines from Liberal, Kans., and St. Paul, Minn., area.

Glenn W. Clark, Cities Service attorney, told the commission the proposed source of Mid-Continent's gas is not dependable because of a faulty contract and declared the reserves in the area would be exhausted in 9 years at the company's proposed rate of usage.

Lawrence I. Shaw, Northern Natural counsel, pointed out that FPC had dismissed his company's application to serve the St. Paul area and declared Mid-Continent had offered no better reasons for supplying the area.

FPC was scheduled to resume hearings Monday in Kansas City in a consolidated case involving proposals of all three companies to build additional gas-transmission facilities from the Guymon-Hugoton area.

Northern Natural Plans Emergency Curtailment

WASHINGTON.—Northern Natural Gas Co.'s plan for emergency curtailment of firm deliveries of natural gas to customers in Nebraska, Iowa, Minnesota, and South Dakota has been accepted by the Federal Power Commission.

The plan, effective until June 1, is designed to protect essential services in case of shortages on the system during periods of extremely cold weather. It was made necessary, FPC said, because Northern Natural's system can deliver only about 90 per cent of the estimated firm requirements when low temperatures prevail.

The emergency rules rely upon Northern Natural's presently effective FPC gas schedules for curtailment of interruptible service deliveries. The rules pertaining to firm deliveries provide for operation of standby gas-manufacturing facilities, reductions of deliveries to commercial and industrial consumers, reductions of building temperatures and uniform curtailment of firm deliveries, FPC said.

The rules approved by the commission are essentially those agreed to by distributing utilities served by Northern Natural during two conferences recently held in Omaha, Nebraska, with staff members of the commission and representatives of Northern Natural.

Phillips Plans Appeal on Underproduction Order

OKLAHOMA CITY.—An Oklahoma Corporation Commission order granting underproduction of the Republic Natural Gas Co. in the Guymon-Hugoton field will be appealed to the State Supreme Court by Phillips Petroleum Co., according to a notice filed with the commission last week.

In a year-end order the commission had reinstated an estimated 1,234,000,000 cu. ft. of underproduction on wells of Republic Natural for the period January 1 through May 31, 1945. Protests were made at the hearing by Phillips, Cities Service Gas Co., and Skelly Oil Co.

Alberta Board Fixes Natural-Gas Price

CALGARY, Alta. — Under an interim order of the Natural Gas Utilities Board of Alberta, the price of Turner Valley natural gas to Canadian Western Natural Gas Co. has been increased from 7¾ to 9 cents per 1,000 cu. ft.

The increase is to take care of the well-head price for producers provided under a previous order of the board. The general result is that producers in the north end of the field, whose gas was previously wasted, will now share in the markets and receive 3 cents per 1,000 cu. ft. In the central and southern fields the basic price is the same, but producers pay part of the cost of operation.

Texas Commission Sets February Gas Allowable

AUSTIN, Tex.—A February natural-gas allowable of 520,864,642 cu. ft. daily was set for Carthage field last week by the Texas Railroad Commission.

Allowable set for other fields are: Rodessa, 29,094,543 cu. ft. daily; Sipe Springs, 2,392,857; La Blanca, 9,214,964; Navarro Crossing, 6,091,092; Whelan, 61,882,000; Alief, 5,750,000; Blue Lake, 5,357,143; and Eden, 285,714.

Kansas Line Completed

An additional 10,000,000 to 15,000,000 cu. ft. of natural gas daily to meet Kansas City's peak-hour demands is expected to be supplied by a recently completed 16-in. pipe line from the Craig storage field near Olathe, Kans., to the Glavin meter station near Kansas City. The line, recently was completed by Cities Service Gas Co., and is expected to reduce recent curtailments to industrial users.

Natural Gasoline

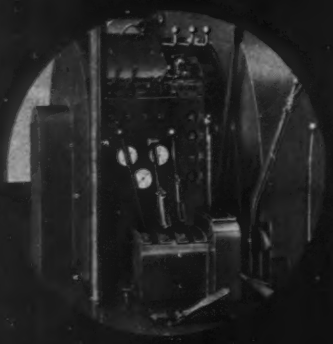
Gas Plant Completed

Completion of the H. W. Snowden Oil & Gas Co. gas-processing plant in Cement field in Oklahoma was announced this week. The plant has a capacity of 20,000,000 cu. ft. daily. Residue is going to Cities Service Gas Co. E. C. Smith is plant superintendent for Snowden.

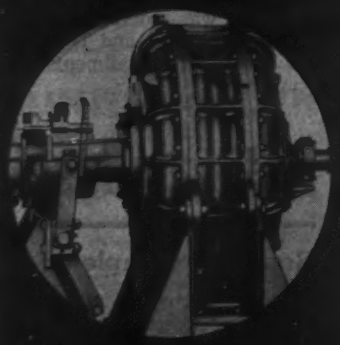
IDEAL TYPE 125

FOR DEEP DRILLING

Ideal Air Friction Drum Clutches Require No Adjustment



Convenient and Easily Operated Controls



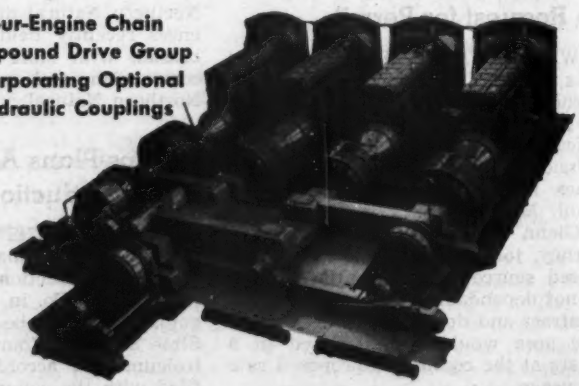
Air Controlled Clutch-Coupling for Hydraulic Brake

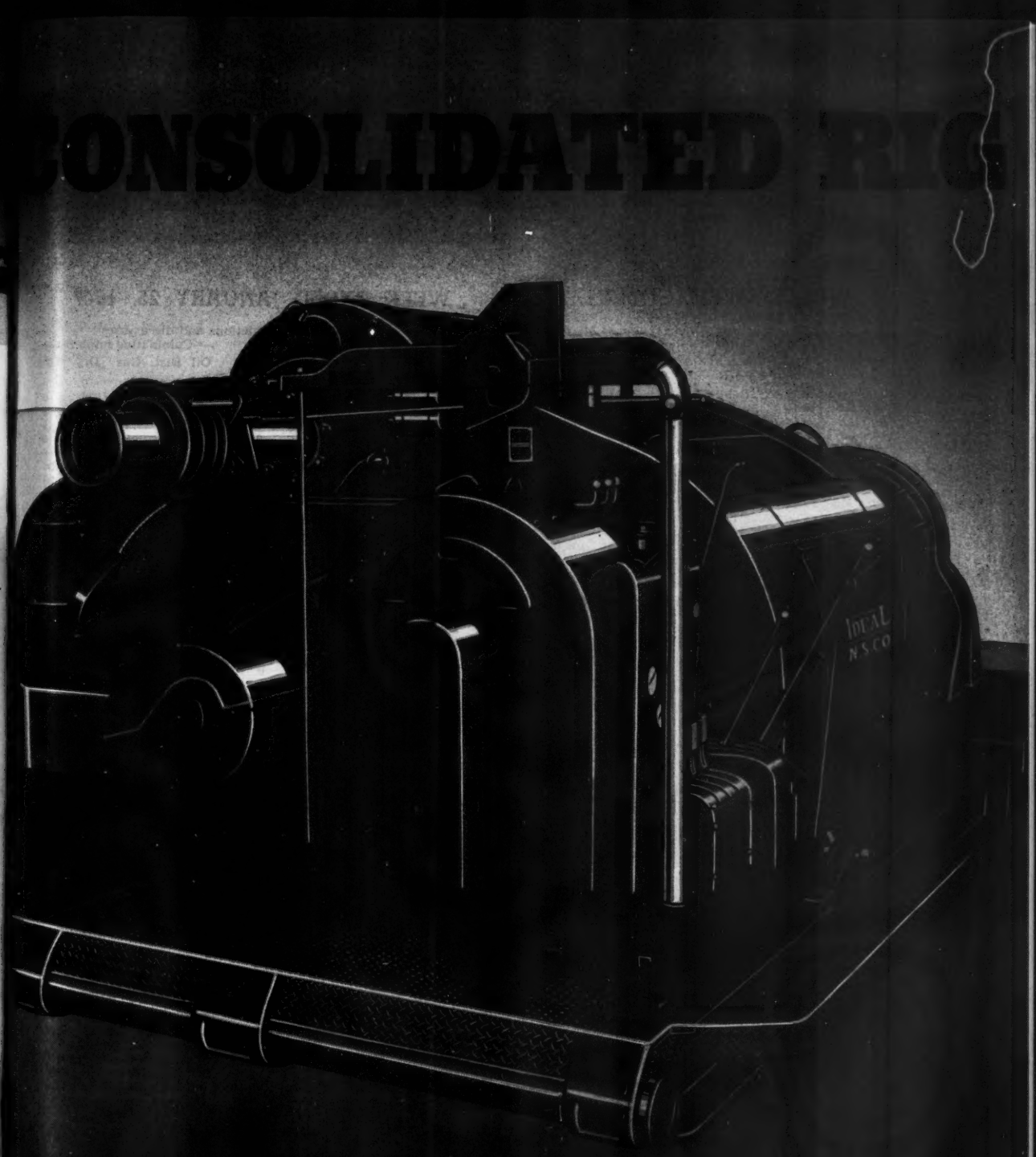
Featuring-

National's rugged Type 125 Rig is equipped with all the essential features for fast economical drilling. A few of the many advantages are: 6 hoisting speeds, 2 empty block speeds and 6 rotary speeds. In addition, this Rig provides—Ideal Air Friction Drum Clutches, Air Controlled Hydromatic Clutch, Full Lubricated Chain Drives, and Air Controlled Engine Throttles.

The six speed drum drive and six speed rotary drive components—including the air operated friction clutches—are positioned outside the supporting line shaft and drum shaft bearings for convenient adjustment.

Four-Engine Chain Compound Drive Group Incorporating Optional Hydraulic Couplings





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STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 25, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	30	15	0	*15	41,032	110	117	0	0	0	0	0	0	0	0	0	0
Pennsylvania	69	28	10	†31	112,147	247	289	0	0	0	0	0	0	0	0	0	0
West Virginia	12	0	10	2	41,338	47	44	0	0	0	0	0	0	0	0	0	0
Ohio	24	8	8	8	72,094	102	65	0	0	0	2	2	0	0	1	4	5
Indiana	7	5	0	2	15,674	35	23	0	0	0	0	0	1	0	0	2	3
Kentucky	5	1	3	1	12,430	34	33	0	0	0	1	1	0	0	0	6	6
Illinois	27	18	0	9	67,889	154	154	0	0	0	4	4	5	0	0	31	36
Michigan	26	4	11	11	50,308	76	53	0	0	1	9	10	0	0	2	27	29
Kansas	43	19	7	17	141,832	197	171	1	0	0	10	11	2	0	0	23	25
Neb., Mo., Iowa	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Oklahoma	73	38	6	29	234,277	312	189	1	0	0	14	15	4	0	0	55	59
Texas	120	79	10	31	550,171	539	613	3	0	3	20	26	18	0	4	81	103
North Central	32	22	2	8	104,488	170	225	1	0	1	5	7	6	0	1	33	40
West	30	24	1	5	142,770	137	132	0	0	0	3	3	1	0	0	10	11
Panhandle	6	2	4	0	18,410	30	28	0	0	0	0	0	0	0	0	0	0
Eastern	6	2	0	4	29,574	32	60	0	0	0	3	3	1	0	0	7	8
Gulf Coast	35	23	2	10	224,597	130	134	2	0	1	6	9	9	0	2	18	29
Southwest	11	6	1	4	30,332	40	34	0	0	1	3	4	1	0	1	13	15
Louisiana	23	13	1	9	149,296	85	85	2	0	0	3	5	3	0	0	13	16
Northern	14	8	0	6	49,041	43	40	0	0	0	2	2	0	0	0	7	7
Southern	9	5	1	3	100,255	42	45	2	0	0	1	3	3	0	0	6	9
Arkansas	4	4	0	0	24,831	18	9	0	0	0	0	0	0	0	0	4	4
Mississippi	5	3	1	1	32,577	30	19	0	0	1	0	1	0	0	1	8	9
Southeastern States	0	0	0	0	0	4	6	0	0	0	0	0	0	0	0	4	4
Montana	3	0	2	1	2,371	14	22	0	0	0	1	1	0	0	0	3	3
Wyoming	1	1	0	0	4,434	18	13	0	0	0	0	0	2	0	0	4	6
Colorado-Utah	2	2	0	0	13,051	13	10	0	0	0	0	0	0	0	0	2	2
New Mexico	6	5	0	1	26,041	33	36	0	0	0	0	0	1	0	0	3	4
California	41	34	2	5	135,269	154	141	1	0	0	5	6	1	0	0	23	24
Total United States	521	277	71	173	1,727,062	2,222	2,093	8	0	5	69	82	37	0	8	293	338
Total previous week	542	297	48	197	1,911,635	1,701	1,575	13	0	0	75	88	29	0	3	224	256
Total Jan. 26, 1946	528	285	50	193	1,778,394			7	1	2	73	83	29	1	9	259	298

Service wells included: *15, †31.

MARKET QUOTATIONS

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.17	....	....	....
19-19.9	1.21	....	....	....
20-20.9	1.24	$1.30	....	$1.17
21-21.9	1.28	1.32	....	1.19
22-22.9	1.32	1.34	....	1.21
23-23.9	1.35	1.36	....	1.23
24-24.9	1.39	1.38	$1.61	1.25
25-25.9	1.43	1.40	1.63	1.27
26-26.9	1.46	1.42	1.65	1.29
27-27.9	1.50	1.44	1.67	1.31
28-28.9	1.54	1.46	1.69	1.33
29-29.9	1.57	1.48	1.71	1.35
30-30.9	1.61	1.50	1.73	1.37
31-31.9	....	1.52	1.75	1.39
32-32.9	....	1.54	1.77	1.41
33-33.9	....	1.56	1.79	1.43
34-34.9	....	1.58	1.81	1.45
35-35.9	....	1.60	1.83	1.47
36-36.9	....	1.62	1.85	1.49
37-37.9	....	1.64	1.87	1.51
38-38.9	....	1.66	1.89	1.53
39-39.9	....	1.68	1.91	1.55
40 and above	....	1.70	1.93	1.57

*For crude from Daboval, El Campo and Sandy Point. †Includes Lea County, New Mexico.

(Quotations shown here are f.o.b. plant in tank cars and in cents per gal. as of last Monday.

REFINERY GASOLINE

Octane (A.S.T.M.)	78-80†	73-75
Mid-Continent*	7.375-7.625	6.750-7.000
Tex. Gulf Coast	7.50-7.75	6.750-7.125
New York Harbor	9-10.75	8-9.25

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades—	26-70	18-55
Oklahoma (Group 3)	5-5.125	6-6.15
N. Texas (f.o.b. plant)	4.5-4.625	5.4-5.55
N. Louisiana (f.o.b. plant)	4.750	5.700

CRUDE-OIL PRICES

Representative posted schedules per bbl.

East Texas	$1.70
Kettleman Hills, California*	1.69
Beauregard Parish	1.65
Illinois Basin	1.82
Pecos County, Texas (Yates)	1.40
Bradford, Pennsylvania	3.65
Eastern Ill., and Western Ind.	1.67
Tomball, Texas Gulf Coast	1.85

Note: Crude prices exclusive of subsidy.

A.P.I. REFINERY REPORT

Week ended January 18, 1947

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Distillate	Residual
East Coast	704	21,117	18,444	7,135
Appalachian	171	3,523	600	466
Ill., Ind., Ky.	802	18,756	4,843	3,475
Okla., Kan., Mo.	399	9,360	2,044	1,124
Inland Texas	211	3,840	442	712
Tex. Gulf Cst.	1,139	15,035	10,053	6,936
La. Gulf Cst.	324	5,579	3,681	1,957
N. La., Ark.	61	1,749	622	120
Rocky Mtn.	140	2,350	444	573
California	825	16,704	11,553	28,041
Total 1-18-47	4,776	98,013	52,726	50,539
Total 1-11-47	4,778	96,547	54,788	51,423
Total 1-19-46	4,575	101,109	31,428	37,371

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended—	Bbl. of crude*
January 18, 1947	221,144,000
January 11, 1947	220,553,000
January 19, 1946	219,709,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Jan. 25 crude oil	B. of M. Jan. demand	Jan. 18 crude oil
Alabama	900	1,200	600
Arkansas	78,400	76,000	78,250
California	900,500	838,000	878,300
Colorado	37,020	33,000	36,710
Eastern	65,500	64,200	64,000
Florida	240	200	240
Illinois	200,500	209,000	194,600
Indiana	18,100	19,000	17,200
Kansas	285,300	260,000	257,050
Kentucky	27,700	28,000	27,750
Louisiana	416,675	382,000	416,375
North Louisiana	103,050	.....	102,750
South Louisiana	313,625	.....	313,625
Michigan	45,415	46,000	42,250
Mississippi	87,500	62,000	85,650
Montana	21,050	24,000	22,960
Nebraska	700	800	700
New Mexico	103,000	98,000	103,000
Oklahoma	364,650	375,000	363,650
Texas	1,931,615	2,030,000	1,931,615
District 1 (Southwest)	19,085	.....	19,085
District 2 (Southwest)	133,110	.....	133,110
District 4 (Southwest)	206,525	.....	206,525
District 3 (Gulf Coast)	412,175	.....	412,175
District 5 (Eastern)	33,700	.....	33,700
District 6 (Eastern)	99,435	.....	99,435
East Texas field	301,000	.....	301,000
District 7C (West)	27,585	.....	27,585
District 8 (West)	464,725	.....	464,725
District 7B (W. Central)	34,000	.....	34,000
District 9 (N. Central)	118,225	.....	118,225
District 10 (Panhandle)	82,050	.....	82,050
Wyoming	105,280	93,000	105,110
Miscellaneous	.....	600	.....
Total United States	*4,690,045	4,640,000	4,626,010

Change from prev. week, up 64,035

Total production January 1-January 25 ..... †116,476,200 bbl.
Same period last year (crude plus condensate) .. 123,345,450 bbl.
*Not incl. 25,260 bbl. condensate. †Incl. 631,500 bbl. condensate.

CRUDE-OIL STOCKS 221,144,000 bbl. as of January 18—up 591,000 bbl. One year ago 219,709,000 bbl.

GASOLINE STOCKS 98,013,000 bbl. as of January 18—up 1,466,000 bbl. One year ago 101,109,000 bbl.

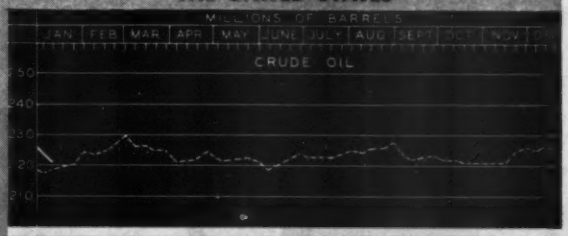
RESIDUAL FUEL-OIL STOCKS 50,539,000 bbl. as of January 18—down 884,000 bbl. One year ago 37,371,000 bbl.

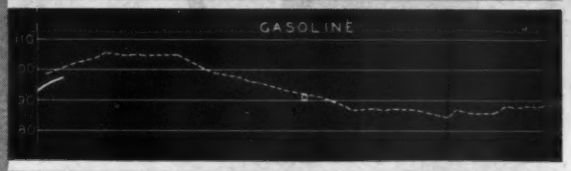
GAS OIL AND DISTILLATE STOCKS 52,726,000 bbl. as of January 18—down 2,062,000 bbl. One year ago 31,428,000 bbl.

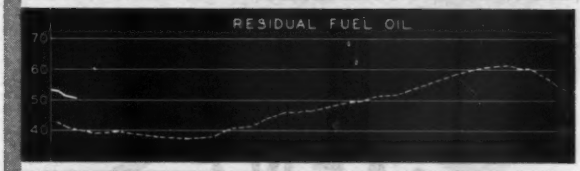
CRUDE-OIL PRODUCTION 4,690,045 bbl. as of January 25—up 64,035 bbl. One year ago 4,584,450 bbl.

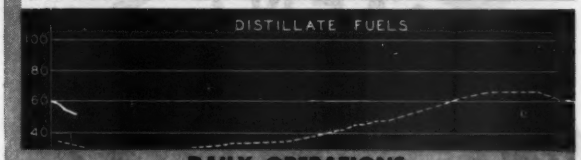
REFINERY RUNS 4,776,000 bbl. daily week ended January 18—down 2,000 bbl. One year ago 4,575,000 bbl.

OIL STOCKS IN THE UNITED STATES

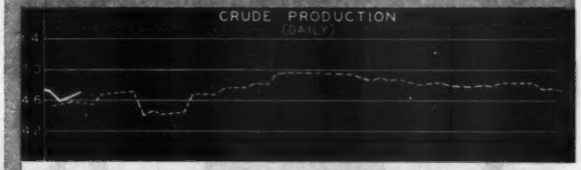


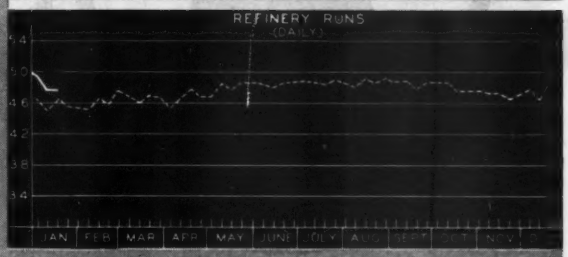




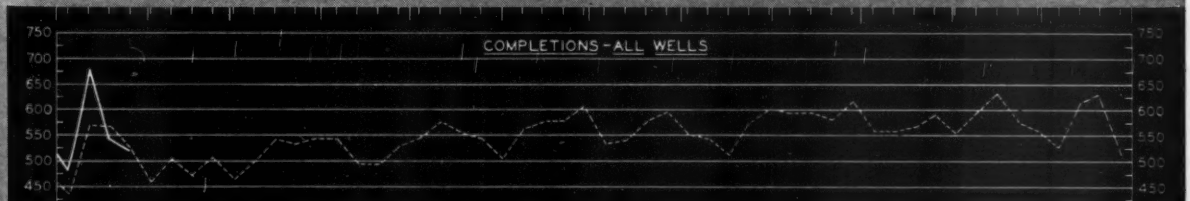


DAILY OPERATIONS





Solid line charts weekly completions, service wells in Eastern area included.



Dependability

THE slide rule's dependability has been proved through long-time use. The same thing applies to oil well cements ... dependability proved by performance is the best rule to go by. The point to bear in mind about LONE STAR Cements is that they are designed to meet today's field conditions, based on continuing study of problems at the drilling rig ... produced under rigid laboratory control for utmost uniformity in quality ... pre-tested to assure dependable performance in the field. Three Lone Star Cements to meet today's conditions ... select the one that fits your job.

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Exploration and Drilling

Research to Aid in Finding Oil

by Charles J. Deegan

THERE is a vast amount of research being conducted in the industry at this time, the ultimate objective of which is the finding of more oil fields, and if possible, at lower costs. The final test of this work, as of all exploration work, is the drilling of a wildcat well, and this is expensive. The necessary assembling of a block of acreage, with good titles, on which to locate the wildcat test is also expensive.

Generally, much of the present research, if successful, would eliminate most of the unfavorable areas from the wildcat drilling program. Likewise, anything that will permit elimination of the less promising lines of research attack should add to its effectiveness. On the positive side, anything is worth trying that offers hope of permitting concentration of research effort along the more promising lines.

The Oil and Gas Journal, in its Annual Review and Forecast Number of January 25, 1947, on pages 152 and 153, presents to company executives and their research workers data which may help to narrow the scope of many of their projects and permit concentration of effort along the most promising lines. These data are given in a list of slightly over 100 oil fields in the United States which have produced or will ultimately yield over 100 million barrels.

Out of perhaps 15,000 oil pools that have been found in this country, this mere handful has produced over half of all the oil to date, and contains nearly two-thirds of the presently proven reserves.

From these data the inference is obvious that most of the oil is accumulated only under certain very favorable combinations of natural conditions. Here in this small number of fields the research worker should find, either in the highest or lowest order of magnitude, whatever criterion or limiting factor he is trying to pin down. If it isn't present to an extreme degree, or conspicuously absent, in these fields it is highly improbable that it has any great significance so far as oil accumulation is concerned.

The mere list of names is sufficient for any experienced oil man or geologist to recognize that many geological time periods are concerned; many varieties of structural traps; association and perhaps nonassociation with major unconformities; close association with certain major regional tectonic forces in some cases, perhaps no such association in others. There are both sandstone and limestone reservoirs; certainly a wide variation in porosity and permeability parameters among the sand reservoirs; probably a wide range in the type and source of the porosity among the limestone reservoirs. The variation in the salinity of the reservoir water associated with the oil must be substantial.

The factors listed above are by no means all of the important ones. However, merely listing these few in a very general qualitative observation points up an obvious need. This is for a systematic and, as far as possible, quantitative classification of many pertinent geological factors to accompany this list of fields.

With quantitative data on all these other geological factors to go with the ultimate yield of oil, the fields could be reclassified, using the various geological factors as the indexing basis. The minimum result of such work would be a series of correlations which would reveal relationships or nonrelationships between large accumulations of oil and a geological factor or a grouping of geological factors.

A more probable result would be to bring to a somewhat sharper focus much of the research work now being carried on. The magnitude of any preliminary reconnaissance in a given research subject could be appreciably reduced by confining it to 100-odd oil fields. In many cases it could be narrowed still more. Thus if the research project were definitely concerned only with limestone production, or only with sand production, the number of large fields affected would immediately be reduced by a considerable margin.

Reservoir-fluid research concerned with salinity could probably be subdivided on a basis of groupings of salinity ranges that would correlate with groups of large fields, because enough is already known to hazard the guess that in this 100-field list, marked differences in total salinity will be found. This type of research will probably also be easily subdivided into sand and lime fields. Many other possibilities will occur to those who are interested.

The pertinent thing is that all data collected for investigation would have the definite common denominator of being closely associated with large yields of oil. The ultimate objective of the research now going on is to obtain profits from finding and developing large yields of oil, therefore anything that aids more definite concentration of research toward this objective is worth while.

The accumulation of data on some items will be relatively simple; merely a collecting and assembly job. On others it will be more difficult. There is the definite advantage that these 100-odd giant fields have been the subject of far more than average interest and study throughout the years. Therefore, however scattered they may be, there is a very large number of data available, if they can be gathered, sorted, and put out in useful form for correlation with ultimate yield.

TEXAS GULF COAST

New Pool for Wharton County

HOUSTON.—A new producing area for Wharton County has been opened by Gilcrease Oil Co. 6 W. W. Duson, in I&GN Survey, 6,200 ft. west of production in Kubella pool. Drilled to a total depth of 4,667 ft., on potential gage flowed 145 bbl. of 24°-gravity oil daily through a 10/64-in. choke. Production is from saturated section topped at 4,662 ft., with perforations at 4,663-66 ft.

A new gas pool has been opened by Standard Oil Co. of Kansas 1 August Pietsch from the Wilcox sands, located 8 miles north of LaGrange, in J. R. Phillips League, Abstract 83, Fayette County. Total depth is 6,918 ft. in the Midway, topped at 6,870 ft., and the 5½-in. casing is cemented to 6,641 ft. Perforations were made from 6,521-27 ft., and on initial gage flowed 2,900,000 cu. ft. of gas per day through a ¼-in. choke with 2,110 psi. flowing pressure on

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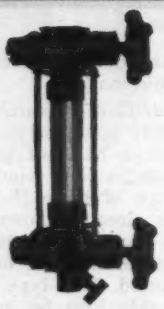

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the tubing and 2,210 psi. on the casing. On a 2-hour drill-stem test, prior to completion, through perforations at 6,535-39 ft., it flowed oil, gas and salt water, through ¼-in. chokes. Returns were lost when a main drive shaft broke, and operators had to circulate until repairs were made. These perforations were squeezed and pipe reperforated for the completion as a gas discovery.

Hinkle Drilling Co. 1 Miller-Vidor Land Co., wildcat in Orange County, 9 miles north and a little west of their North Port Neches discovery well, and in the J. M. Swisher Survey 2, is standing with 5½-in. production pipe set at 7,810 ft. and is scheduled to test early next week. Total depth is 7,910 ft. Approximately 31 ft. of Hackberry sands in this test showed gas and condensate from 7,767-98 ft. First shows of gas and condensate showed from 6,943-66 ft. with two others from 7,267-82 ft. and 7,577-82 ft. Oil saturation was found in sands of the Frio from 7,329-41 ft.

There were 16 new locations this week of which 5 are wildcats, 1 each in Brazoria, Fort Bend, San Jacinto, Washington and Wharton counties. One new gas pool in Fayette County and 1 new oil pool in Wharton County were opened this week while four wildcats were dry, one each in Brazoria, Fort Bend, Madison, and Wharton counties. There were 12 oil wells, 1 gas, and 4 dry completions this week.

UPPER GULF COAST SUCCESSFUL WILDCATS

Fayette County: New gas pool—The Standard Oil Co. of Kansas 1 August Pietsch, in J. R. Phillips League, 8 mi. N of LaGrange, top Wilcox sand 6,520 ft., perf. 6,521-27 ft., TD 6,918 ft., IP 2,900,000 cu. ft. gas per day through a ¼-in. choke, shut-in TP 2,175 psi., shut-in CP 2,290 psi., TP 2,110 psi., and CP 2,210 psi. flowing, dry gas, no water.

Wharton County: New oil pool—Gilcrease Oil Co. 6 W. W. Duson, in I&GN Sur., Sec. 23, 6,200 ft. W of Kubella field production, TD 4,667 ft., perf. 4,663-66 ft., IP 145 bbl. oil per day through a 10/64-in. choke, gas-oil ratio 295, TP 420 psi., CP 670 psi., gravity 24°, 1 per cent salt water.

UPPER GULF COAST TEXAS WILDCAT FAILURES

Brazoria County: Humble Oil & Refg. Co. 1 M. E. Belsley et al, in HT&B Sur., 9 mi. SW of Alvin, dry, TD 9,950 ft.

Fort Bend County: Martin Thompson 1 Mrs. Ethel M. Hand, in David H. Milburn Sur., 3 mi. SW of Thompson field production, dry, TD 6,516 ft.

Madison County: Sun Oil Co. 1 J. A. Fannin, in Thos. Boatright Sur., 2 mi. SW of Madisonville, dry, TD 3,065 ft.

Wharton County: General Crude Oil Co. et al 1 R. A. Bassett, in Seth Ingram Sur., ¼ mi. S of New Gulf townsite, dry, TD 8,502 ft.

N. CENTRAL TEXAS

New Caddo Pool Likely For South Archer County

WICHITA FALLS.—New Caddo production was indicated at L. T. Burns 1 R. O. Andrews, Section 1,806, TE&L Survey, 6 miles southeast of Anarene, in south Archer County. Saturation in the limestone is 4,452-4,543 ft. Operators plugged back from 5,245 ft. to 4,624 ft. and set casing. Perforation and production tests were to be run.

Gulf Oil Corp.'s 16 Earl Spring, which last week opened first Ellenburger production in the Ringgold area of eastern Clay and western Montague counties, had dropped off some, and on the last 24-hour test flowed 39 bbl. of oil, with 600,000 cu. ft. of gas. The well is flowing from perforations at 5,707-10 ft. The Ellenburger, topped at 5,704 ft., had a slight show of gas at 5,706-09 ft., and a show of oil at 5,722-25 ft. At total depth of 5,728 ft. it had 1,150 ft. of oil in the hole and operators acidized before making production tests. Another Ellenburger discovery in southeast Clay County, Continental Oil Co. 1 Scott, 4 miles southwest of Vashti, made completion potential of 58 bbl. of 40°-gravity oil from 6,485-6,515 ft., after acid treatment.

In Colin County, Standard Oil Co. of Texas 1 Newsome, a wildcat in the John Cox Survey and northeast of the town of Frisco, cored from 6,762-77 ft., recovering 5 ft. of hard, tight oil-stained sand, and 8 ft. of hard, tight sand with no shows. Operators were drilling ahead below 6,822 ft. in sand with shale streaks.

The Texas Co. 1 Hauser, Wilbarger County Ellenburger test, 2 miles southeast of Oklaunion, was last reported drilling below 7,275 ft., not yet in the Ellenburger. In Montague County, 6 miles southeast of Montague, Continental Oil Co.'s 1 S. T. Tompkins, stopped at 7,704 ft. in broken limestone, ran electric log and prepared to drill deeper. It had the Viola at 7,596 ft., showing a stain and odor at 7,598-7,612 ft., after which it made a drill-stem test at that depth but recovered only 10 ft. of drilling mud in 1 hour.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT

Clay County: Continental Oil Co. 1 Roscoe Scott, Sec. 3,239, TE&L Co. Sur., 4 mi. SW Vashti, pumped 58 bbl. 40° oil, Ellenburger 6,485-6,515 ft., TD 6,515 ft., elev. 1,049 ft.

NORTH CENTRAL TEXAS WILDCAT FAILURE

Archer County: Fain & McGaha 1 Carson, R. Neil Sur., 3 mi. E Holliday, dry, TD 4,510 ft., KMA limestone 4,210 ft., dry sand 4,360-65 ft.

Clay County: H. S. Gray 1 H. W. McCarty, Specht & McCutcheon Sur., ¾ mi. NE Thornberry, dry, TD 765 ft.

Jack County: A. R. Dillard 2 J. H. Marley,

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Throckmorton County: S. D. Johnson and Acme Tool & Dye Co. 1 Davis, Sec. 943, TE&L Sur., 4½ mi. NW Woodson, dry, TD 4,124 ft., top limestone 4,020 ft., light stain and odor.

Young County: Russell Maguire 1 A. C. Casey, Sec. 1,486, TE&L Sur., 3 mi. NE Jean, dry, TD 4,402 ft., Caddo 4,388 ft., elev. 1,195 ft.

Scott Bros. 1 Paul Wilson, Sec. 77, TE&L Sur., 2 mi. NE Padgitt, dry, TD 1,204 ft. in shale and lime.

WEST CENTRAL TEXAS WILDCAT FAILURES

Fisher County: American Liberty Oil Co. 1 W. A. Cross, Blk. 45, Bastrop CSL 323, 2½ mi. S Sylvester, dry, TD 4,868 ft., Dotham 2,790 ft., Noodle Creek 2,902 ft., Flippen 3,143 ft., elev. 1,849 ft.

Haskell County: T. D. Humphrey 2 Burnett, J. Campbell Sur. 58, 8½ mi. NE Haskell, dry, TD 4,521 ft., sandy lime with odor 2,822-26 ft., dry sand 3,951-57 ft., elev. 1,475 ft.

Jones County: W. D. Baker 1 Baker, Wm. Smith Sur. 14, 4½ mi. SE Lueders, dry, TD 1,876 ft., Dotham limestone 1,258 ft., Saddle Creek 1,550 ft., elev. 1,648 ft.

CANADIAN FIELDS

Another Good Well for North Turner Valley

CHATHAM.—In North Turner Valley, Home-Millarville 24, LSD 12, 33-20-3w5, finished with Madison limestone at 7,891-8,371 ft. and made initial open flow of 1,483 bbl. after further acidizing. Settled production is reported 1,114 bbl.

In the North Extension area, Foothills Oil & Gas 25, LSD 6, 9-21-3w5, is finishing with Madison limestone at 8,627-9,047 ft. Home 25, LSD 3, 33-20-3w5, has started drilling in North Turner Valley, and two other tests are drilling in the North Extension area.

Crude prices.—Imperial Oil and Royalite Oil Co. have announced an advance of 50 cents per barrel in prices for Turner Valley crude, following a previous advance of about 45 cents a year ago. The new prices, effective January 15, range from $2.47 for 33° to 33.9° gravity to $3.09 for crude above 64° gravity, the price increasing 2 cents for each degree. The new price scale is the highest in the history of the field.

Foremost.—McColl-Frontenac Oil Co. and Union Oil Co. which have carried on a series of successful joint tests for gas in the Pinhorn Dome area, southern Alberta, are now undertaking similar development in the Foremost area, farther north. McColl-Union 6-D, LSD 6, 25-4-10w4, is below 2,051 ft. and McColl-Union 10-B, LSD 10, 22-7-10w4, is spudding. In the same general area Foremost-Province 13-17-5-11, LSD 8, 17-5-11w4, has spudded.

Pinhorn.—In connection with the Pinhorn Dome development it has been announced that operations by McColl-Frontenac in conjunction with Union Oil have indicated a daily gas production of close to 100,000,000 cu. ft. and that any considerable addition to this would bring a decision to build a refinery where chemical byproducts would be included in the output. A decision as to this is expected before the end of 1947.

Ram River.—In the central Alberta foothills, Ram River Oils 4, LSD 9, 36-34-10w3, which has been testing in Devonian limestone at 1,460 ft., will be shot with 10 quarts, to be followed with 40 to 50 quarts if necessary. The porous formation shows light crude and it is hoped the shot will develop commercial production. Ram River 3, LSD 12, 1-37-11w5, is redrilling below 3,271 ft.

Loydminster.—In the Alberta section of the Lloydminster field, Midfield 7, LSD 15, 26-49-1w4, finished at 1,959 ft., is on the

(Continued on page 107)

SOUTH LOUISIANA

Kaplan Pool Discovery Makes 62 Bbl. Potential

NEW ORLEANS.—Humble Oil & Refining Co. 1 Alfred Ray Romaine et al, discovery well for the Kaplan field, Vermilion Parish, 25-12s-1e, was drilled to a total depth of 12,482 ft., and on potential test flowed 62 bbl. of 31°-gravity oil per day through a ¼-in. choke, gas-oil ratio 183 cu. ft., tubing pressure 75 psi. No water was in the flow. Production is through perforations at 11,066-080 ft.

Stanolind Oil & Gas Co. 1 Ezeb Guillory, discovery oil well in the Swords area, 29-6s-3e, St. Landry Parish, has been completed for a potential of 97 bbl. of 46°-gravity oil per day through a 10/64-in. choke, tubing pressure 2,500 psi., casing pressure 2,250 psi. Production is through perforations at 8,952-58 ft. Total depth 9,801 ft. with 7-in. casing set at 9,452 ft.

The Barataria pool in Jefferson Parish has been extended westward 1 mile by The California Co. 1 Rathborne Land Co., 2-16s-23e. Drilled to a total depth of 10,700 ft., with 7-in. casing perforated at 8,930-38 ft., the well produced an initial gage of 260 bbl. of 36°-gravity pipe line oil daily through a 5/32-in. choke with 1,500 psi. flowing pressure on the tubing and a gas-oil ratio of 886 cu. ft.

The second well in the Bayou Choupique discovery area, in Calcasieu Parish, has

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been completed in a new sand. The Union Sulphur Co. 1 J. G. Gray Estate, ¼ mile north of the 1 Ellender discovery, 17-11s-10w, was drilled to a total depth of 9,500 ft., this well flowed 21 bbl. of condensate daily along with 850,000 cu. ft. of gas through an 8/64-in. choke, flowing pressure on tubing 3,125 psi., gravity 41°, gas-oil ratio 39,196 cu. ft. Production is through perforations at 8,612-16 ft. The discovery of this area produces 40°-gravity oil from Marginulina sands at 8,825-31 ft.

The 13 new locations reported this week included 1 wildcat in Calcasieu Parish. Iberia Parish received the greatest activity with four new starts. The nine completions were five oil, one gas, and three dry. Two of the three exploratory completions opened new oil pools, one each in St. Landry and Vermilion parishes, while one was a dry hole in St. Mary Parish.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

St. Landry Parish: New oil pool, Swords area, Stanolind Oil & Gas Co. 1 Ezeb Guillory, 29-6s-2e, 3 mi. SW of Swords townsite, TD 9,861 ft., perf. 8,952-58 ft., IP 97 bbl. per day through a 10/64-in. choke, TP 2,500 psi., CW 2,250 psi., gravity 46°, no water.

Vermilion Parish: New oil pool, Kaplan field—Humble 1 Alfred Ray Romaine et al, 25-12s-1e, TD 12,482 ft., perf. 11,066-080 ft., IP 62 bbl. per day through a ¼-in. choke, gas-oil ratio 183, TP 70 psi., gravity 31°, no water.

SOUTH LOUISIANA WILDCAT FAILURE

St. Mary Parish: Humble 1 Humble-Cote Blanche, in Cote Blanche area, Twp. 15s-7e, dry, TD 13,281 ft.

APPALACHIAN FIELD

Elk District Gets Good Oriskany Well

PITTSBURGH.—In Elk district, Kanawha County, United Fuel Gas Co. completed 5,800 Edward Gebhart in the Oriskany sand with a final open flow, after shot, of 2,989,000 cu. ft. of gas. Surface elevation is 1,044 ft., Corniferous lime 5,246 ft., Oriskany 5,366-5,426 ft., gas 5,380-91 ft., shot 5,373-5,426 ft., total depth 5,428 ft.

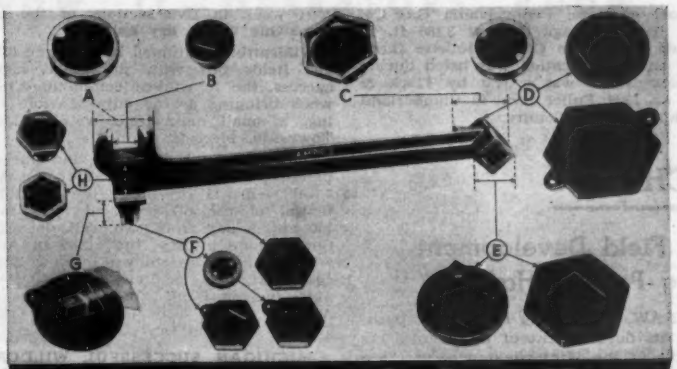
In Reedy district, Wirt County, West Virginia, United Carbon Co. found the Oriskany sand dry in the wildcat on A. Carter Smith farm. Surface elevation is 830 ft., Corniferous lime 5,392 ft., Oriskany 5,620-96 ft., total depth 5,700 ft.

In Baileyville district, Wyoming County, United Producing Co. completed a fair well, 1,389 W. M. Ritter Lumber Co., with a gage of 2,909,000 cu. ft. gas from the Berea at 3,418-44 ft., shot 3,418-38 ft., rock pressure 730 psi. in 24 hours, total depth 3,445 ft. In Oceana district, Hope Natural Gas Co. completed 9,040 Perry C. Cook good for 1,555,000 cu. ft. of gas, after shot, Berea 3,112-50 ft., gas 3,128-50 ft., shot 3,126-50 ft., rock pressure 820 psi. 10 hours, total depth 3,161 ft. Here, this company completed 9,041 Loup Creek Colliery Co. with a final gage of 881,000 cu. ft. gas, after shot. The Princeton sand was logged at 1,799-1,826 ft., gas 1,805-13 ft., Ravencliff sand 1,900-35 ft., gas 1,918 ft., shot, total depth 1,982 ft.

In Valley district, Armstrong County, southwest Pennsylvania, Stanley Wray & Morrison completed a large Speechley sand well in a test on L. H. Maguire farm with a final open flow of 2,248,000 cu. ft. of gas, total depth 2,624 ft.

In Morris Township, Washington County, Joseph Johnson et al completed a test on John Wolf farm good for 980,000 cu. ft. of gas, with the Big Injun sand topped at 1,765 ft., gas 1,852-80 ft., total depth 1,890 ft.

In Wayne Township, Erie County, north-



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east part of state, Pennsylvania Gas Co. topped the Onondaga lime at 3,185 ft. in the deep wildcat on C. J. Lafollette farm.

Only one new location was listed during the week which was a test by Flack & Bloom on J. S. Fuller farm in Cumberland Township, Greene County.

MICHIGAN

Gas Field Development Being Pushed Hard

SAGINAW.—Consumers Power Co., pushing its development of the natural-gas resources of the Winterfield pool in Clare County, completed 10 more wells in the past week in five sections of the township. One was a dry hole.

Wildcatting continued in Michigan oil and gas fields but with the usual lack of success, the 10 wildcat completions of the week bringing as the only tangible showing, a small natural-gas well in Morton Township, Mecosta County.

Out of a total of 26 oil and gas completions the record showed 11 gas wells, 4 oil wells, 11 dry holes. The initial potential of the oil producers just missed 100 bbl. a day from two wells in Allegan County, one in Bay, the other in Arbela.

The midwinter letdown in new activity continued, new locations being limited to nine—two in Kent County, one each in Allegan, Arenac, Isabella, Ogemaw, Ottawa, Tuscola and Van Buren.

MICHIGAN SUCCESSFUL WILDCAT

Mecosta County, Morton Township: Michigan Consolidated Gas Co. 1 Smith, NW 22-14n-8w, gas well, 274,000 cu. ft., TD 1,303 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Lee Township: J. W. Lang Co. 1 Crane, NE SE NW 6-1n-15w, dry in Traverse, TD 1,214 ft.

Clare County, Garfield Township: Samuel C. Hindman 1 Krabell Estate, SE SE SE 22-17n-6w, dry in Dundee, TD 4,084 ft.

Isabella County, Nottawa Township: Merrill Drilling Co.-Clayton Development Co. 1 Matteson, SW SW SE 12-15n-5w, dry, TD 1,726 ft.

Kent County, Algoma Township: S. L. McCall 1 Hull, SE SE SW 8-9n-11w, dry in Traverse, TD 2,423 ft.

Mecosta County, Fork Township: Sun Oil Co. 1 Harper, NE SW NE 31-16n-7w, dry in Dundee, TD 4,018 ft.

Sheridan Township: Michigan Consolidated Gas Co. 1 Bliss-State, NE NW 17-15n-7w, dry, TD 1,433 ft.

Montcalm County, Bloomer Township: Clifford A. Perry 1 Whitmore, SE SW NW 18-9n-5w, dry in Monroe, TD 3,268 ft.

Van Buren County, Almena Township: Stuart L. Godfrey 1 Houghton, SW SW NE 16-2s-13w, dry in Traverse, TD 1,306 ft.

Wexford County, Clam Lake Township: William A. Comstock, Tr. 1 Carlson, SE NW SE 17-21n-9w, dry in Dundee, TD 4,072 ft.

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SOUTHWEST TEXAS

New Condensate Pool For Bee County

CORPUS CHRISTI.—One mile northwest of the Burnell-Wilcox field in Bee County, Tom Slick 1-D Slick fee has opened a new gas-condensate pool. This well came in making amber-colored condensate with 2,000 psi. tubing and 2,400 psi. casing pressure, no water in the flow. Total depth is 6,637 ft., and 5½-in. casing is set at 6,600 ft. with perforations above that depth. This well is located in the J. Richardson Survey, Abstract 393.

In Duval County, 5 miles northeast of Bruni, Tom Graham and C. A. M. Corp. 1 Rosa V. Benavides opened a new gas pool in Lot 3, Section 24, Cole Petroleum subdivision of Mariano Arispe grant. On potential test flowed 1,630,000 cu. ft. of dry gas per day, open flow. Top of pay is 3,320 ft., with perforations at 3,319-25 ft.

F. M. Boykin 1 Hill-Jones, 2,500 ft. southwest of the nearest oil well in Midway field, San Patricio County, has been completed with a potential of 56,000,000 cu. ft. of gas, open flow, through perforations at 6,178-180 ft.

Continental Oil Co. 1 Rusehaupt, wildcat 4½ miles southwest of Meyersville, in DeWitt County, Pat. Dowlearn Survey, has tested several gas-condensate sands and some oil shows below 8,540 ft. Total depth is 9,194 ft., and operators have set 6-in. casing on bottom for completion attempt.

Atlantic Refining Co. 1 Walter Eschberger, east outpost at North Minnie Bock field, Nueces County, was completed in the Zone 13 discovery oil pay at a different level from previous wells in this pay, apparently across a fault from the other wells. This well flowed 189 bbl. of 36°-gravity oil per day through a 5/32-in. choke, gas-oil ratio 656 cu. ft., tubing pressure 850 psi., through perforations at 6,120-24 ft., 100 ft. higher than other producers in this pay.

H. J. Mosser and W. R. Quinn 1 Charles Mull, 1½ miles west of Alice field in Jim Wells County, is reported to have blown out at 5,177 ft., but controlled successfully, and now is cleaning through bleeder valves. This well is located in C.C.I. Co. Survey,

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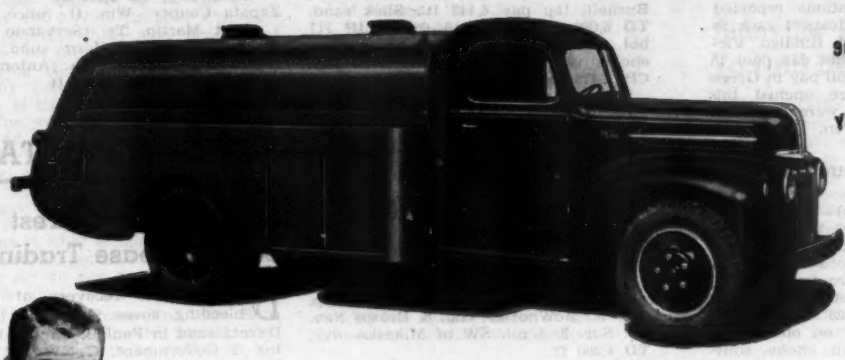

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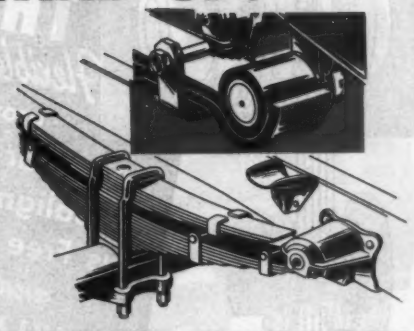

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Abstract 117, approximately 6 miles southwest of Alice.

There were 28 new locations reported this week with 8 being wildcats, 1 each in Bastrop, Bee, DeWitt, Duval, Hidalgo, Victoria, Webb and Zavala. One gas pool in Duval County and one new oil pay in Green field, Karnes County, were opened this week while five wildcats were dry, one each in Caldwell, Cameron, Live Oak, Starr and Zapata counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Duval County: New gas pool—Tom Graham and C.A.M. Corp. 1 Rosa V. Benavides, Lot 3, Sec. 24, Cole Petr. subd. of Mariano Arispe Grant 75, 5 mi. NE of Bruni, 2 mi. NE of Ohern field and 1½ mi. SE of Cole field, top pay 3,320 ft., TD 3,333 ft., perf. 3,319-25 ft., IP 1,630,000 cu. ft. gas per day on open flow, TP 1,180 psi., on 13/64-in. choke, shut-in pressure 1,240 psi., no water.

Karnes County: New oil pay, Green field—Van Norman Oil Co. 1 O. A. Mudd, in Carlos Martinez grant, 3 mi. N of Burnell, top pay 6,442 ft., Slick sand, TD 6,680 ft., perf. 6,464-66 ft., IP 111 bbl. oil per day through a 5/32-in. choke, gas-oil ratio 400, TP 470 psi., CP 1,275 psi., gravity 35°, no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Caldwell County: W. Killam 1 Andrew J. Rodenberg, Guadalupe College Sur., dry, TD 2,322 ft.

Cameron County: Standard Oil Co. of Texas and Shell Oil Co. 1 W. S. Parks, in Share 22, Petrero del Espiritu Santo grant, 7 mi. NE of Rio Hondo, dry, TD 8,836 ft.

Live Oak County: Smith-Story-Wood Corp. 1 E. W. McWhorter, Gal. & Brazos Nav. Co. Sur. 2, 4 mi. SW of Mikeska, dry, TD 4,200 ft.

Starr County: W. D. Kennard et al 1 Starr Co. Cattle Co., Porcion 89, 20 mi. NE of Rio Grande City, 1 mi. NE of Ross field, dry, TD 2,803 ft.

Zapata County: Wm. H. Spice, Jr. 2 Albert Martin, Tr. (Servando Benavides Est.) Fansler-O'Hern subd. of Carta Blanca Ranch, Villa (Antonio Zapata) grant, dry, TD 2,164 ft.

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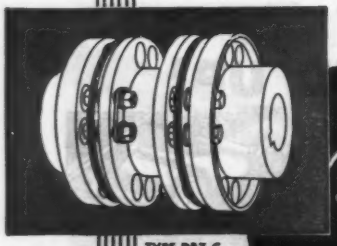

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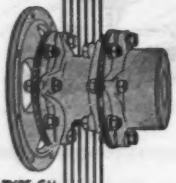

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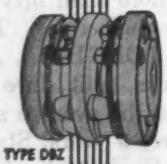

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ROCKY MOUNTAIN

San Juan Basin Test Sets Off Lease Trading

DENVER.—The recovery of 3½ ft. of bleeding cores from the top of the Dakota sand in Paul B. English-Byrd-Frost, Inc. 1 Government, C NW SW 4-27n-10w, Kutz Canyon District, San Juan County, New Mexico, set off an unprecedented leasing campaign throughout the San Juan Basin although the well has not yet been drilled into the sand. Reports from the New Mexico State land office say that more than 500,000 acres have been leased or had a change in ownership in the last 30 days. Much of this land is located on trends out from the Kutz Canyon operation which were spotted while the geology was being worked out and was taken up as soon as favorable results were observed in the test well. Several big deals on large blocks already assembled are reported pending.

The test well topped the Dakota at 4,402 ft., recovered 4 ft. of hard tight sand and 3½ ft. of bleeding cores when operations were suspended to run the 6⅝-in. casing which was set at 6,485 ft. Drilling of the plug and into the sand has been delayed awaiting the arrival of a string of 3-in. drill pipe which is now at the well. Drilling in is expected to begin within the next two or three days. Oil based mud will be used.

McElmo deep test.—Byrd-Frost, Inc. is reported to have acquired the leases on the McElmo structure, Montezuma County, southwestern Colorado, which were surrendered when Stanolind Oil & Gas Co. 1 Government, SW NW 24-36n-18w, was abandoned in 1944 at 7,046 ft. with the tools in the hole, and will move in rig and deepen hole to 8,000 ft. The Stanolind well had the top of the Paradox salt at 4,755 ft., and was still in salt at 6,377 ft., goining into shale and anhydrite between that depth and 6,483 ft. This well was three-fourths of a mile south and east of a well drilled in 1921 by Midwest Oil Co. which had 4,000,000 cu. ft. of gas in black lime at 4,217 ft., and a show of 67° oil at 1,888 ft.

Quealy Dome discovery.—California Co. 2 Holst, SW NE SE 13-17n-77w, Quealy Dome, Albany County, Wyoming, a discovery in the Tensleep, which topped that horizon at 5,480 ft., and swabbed 127 bbl. in 8 hours through perforations at 5,480-5,510 ft., made 192 bbl. in 18 hours on the pump. It then pumped 214 bbl. in 19½ hours. Fluid was lowered 1,777 ft. from the top. When shut in, fluid rose to within 500 ft. of the top.

Phillips in Beaver Creek.—Phillips Petroleum Co. has acquired leases on 640 acres within the unit area of the Beaver Creek field, Fremont County, Wyoming, which is operated by Stanolind Oil & Gas Co., and produces gas from the Lakota sand at 9,000 ft. Acreage is in NE Section 22, S½ Section 23, and NE 26-33-96w, and 1 mile from 6 Unit which is drilling below 7,495 ft., and showing gas in the Frontier. Deal was made with Noland and Hammond, of Casper.

Rangely outpost.—Stanolind and Phillips Petroleum 1 Associated Unit, SE SW 12-2n-103w, most northerly well in the Rangely field, ½ mile from the northern limits of the geological structure as outlined by the U. S. Geological Survey, is being completed as a flowing well. It had the top of the Weber at 6,527 ft. (—1,064) and was drilled to 6,596 ft., 69 ft. into the sand,

and is flowing by heads. It is being put on a choke for a 24-hour test.

Neiber Dome test.—G. & G. Oil Co. 1 Government, NE NW 19-45n-92w, Washakie County, Wyoming, which gave promise of a discovery in the Embar at 10,189 ft., after plugging back from 10,980 ft., only to have the tubing freeze up and shut off the oil, is still trying to overcome the pressure. The well was killed with a blanket plug and tubing was cleaned up only to freeze the second time. Pure Oil Co. 1 Unit, farther north in the Big Horn Basin, which was set on fire with a tracer bullet when the gas broke loose, is still burning. Hydrogen sulfide in the gas runs 30 per cent, making it what is said to be the most poisonous natural gas in the United States, and it was set on fire to protect the surrounding territory from its effects.

Bowdoin wildcat.—Texas Co. 1-822 Bowdoin Unit, SW SW 8-32n-32e, one of a series of three wildcats to be drilled to test the lower horizons on the enormous Bowdoin dome, Phillips County, Montana, is nearing its final stages. It is drilling at 4,489 ft., having topped the Mississippian at 3,975 ft., the Devonian at 4,000 ft., and the Devonian Potlach at 4,070 ft.

New operations.—Eleven new operations were reported, only 1 of which is a wildcat, Florence Drilling Co. 1 Fitzhugh, NW NE NE 4-32n-1e, Chromo District, Archuleta County, Colorado. It will go to the Dakota. Other locations in Colorado were four in the Rangely field. The only new operation in Wyoming was in the Frannie field. Montana had one each in Cat Creek and Cut Bank, and two in Kevin-Sunburst. Northwest New Mexico had one new operation in the Fulcher Basin gas area.

MONTANA WILDCAT FAILURE

Haymaker, Wheatland County: R. C. Tarrant 2 Williams, NE NE SE 21-6n-13e, TD 850 ft., water in Big Elk at 795 ft., completed as water well.

EASTERN TEXAS

Cherokee County Wildcat Testing Various Intervals

DALLAS.—Testing continued at Standard Oil Co. of Texas 1 New Birmingham, Cherokee County wildcat, 2½ miles northwest of Maydelle. After a 1-hour drill-stem test at 9,988-9,997 ft., which recovered some 3,000 ft. of mud with no shows, operators plugged back and were to perforate casing at 9,972-9,980 ft. Best porosity in the Travis Peak, topped at 9,600 ft., was said to be at 9,853-9,936 ft., which is yet to be tested. Other porosity was reported at 9,800-32 ft., 9,766-83 ft., 9,705-08 ft., and 9,620-38 ft. Shows were also reported in the Pettit and Rodessa sections. Original total depth was 10,017 ft., and elevation is 478 ft.

In the new William Wise field, Cherokee County, the first test showing for a dry hole was Clark & Cowden 1-A Southern Pine Lumber Co., a southeast offset to the Wise and Delta 1 Hugghins discovery. This well had 28 ft. more chalk than the discovery, and top of the Woodbine was placed at 5,120 ft., by cores. A drill-stem test, in the Woodbine 6 in., returned only salt water. Operations were said to have been taken over by Wise and Delta who will deepen about 100 ft. and run electrical survey.

EAST TEXAS WILDCAT FAILURES

Henderson County: E. B. LaRue, Jr. 1 Faulk & Coleman, R. S. Rayburn Sur., 12 mi. NE Athens, dry, TD 2,932 ft. in Woodbine.

Houston County: Standard Oil Co. of Kansas 1 G. A. Lundy, B. P. Duncan Sur., 4¼ mi. NW Porter Springs, dry, TD 7,505 ft., sample tops: Pecan 5,735 ft., Woodbine 7,165 ft., porosity 7,216-20 ft., elev. 260 ft.

Van Zandt County: W. W. Bradley 1 T. T. McKibben, Wm. Daniel Sur., 3 mi. N Van, dry, TD 1,510 ft.

Canadian Fields

(Continued from page 99)

pump, with a fair commercial production. Commoil Lloyd 3, LSD 6, 10-50-1w4, testing a northerly extension of the producing area drilled out plug at 1,951 ft. getting a flow of 16°-gravity oil, which is high gravity for this field. The well is believed commercial and Commoil Lloyd 4 has been spotted immediately northwest, in LSD 11, same section. In the Saskatchewan end of the field, Van Lloyd 3, LSD 7, 2-49-28w3, finished at 1,889 ft. with Lower Cretaceous at 1,713 ft., Sparky sand at 1,872 ft., and commercial production indicated.

LA.-ARK.

Bienville Parish Test To Drill Deeper

SHREVEPORT. — Lion Chemical Corp.'s deep test in Bienville Parish, 3 miles east-northeast of the Bryceland area, was reported ready to drill to 10,500 ft. On last report, it was drilling ahead below 9,639 ft. in hard sand, with no shows found in addition to the gas show in the Travis Peak at 7,695-7,740 ft.

C. A. Kinard 1 Ayer Timber Co., NW SW SW 19-15n-10e, Madison Parish, had total depth at 6,140 ft., in the Paluxy, set casing at 5,787 ft., and was preparing to test a good odor found in cores from the Tuscaloosa sand at 5,630-39 ft.

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NORTH TONAWANDA NEW YORK

In Sabine County, some 10 miles southwest of Many, R. W. Norton 1 Louisiana Long Leaf Lumber Co., SW SW NW 13-6n-13w, set casing to 5,415 ft. Total depth is 5,492 ft. but operators plan to plug back into the casing in an effort to regain circulation which was lost at 4,232 ft.

In Arkansas, 2½ miles south of the Woodley field, McAlester Fuel Co. 1-A Patterson, SE SW 19-18s-14w, was drilling below 7,072 ft. in shale. It is planned to test the Smackover.

NORTH LOUISIANA WILDCAT FAILURES

Grant Parish: W. E. Allaum 1 fee, SW SE 14-7n-2w, dry, TD 5,440 ft., no tops reported.

Richland Parish: M. E. Wakefield 1 A. K. Baker, NE NW NW 4-15n-7e, dry, TD 3,520 ft., electric log tops: Wilcox 1,250 ft., no chalk, gas rock 2,645-50 ft., Marine Tuscaloosa 2,950 ft., Massive sand 3,254-60 ft., elev. 69 ft.

CALIFORNIA

Sespe Pay at Elwood Extended Westward

LOS ANGELES.—Sespe zone production in the Elwood field was extended westward under the tidelands area by Signal Oil & Gas Co. 208-11, a slant well drilled out under the ocean. There are several wells on the 1,920-acre lease, obtained from the state about a year ago, slant drilled, but these produce from the Vaqueros, the main pay zone in Elwood. The new well is making about 400 bbl. daily through a ¼-in. choke. Previous Sespe wells in the Elwood field have not been long-lived, hence at the moment, no sizable addition to crude reserves is forecast from this extension.

To the east in Ventura County, an Eocene completion in the Bardsdale field has aroused interest in the possibilities of deep sand development in other Ventura County shallow fields. Milner Oil Co. completed 2 Dryden, flowing 480 bbl. of 35°-gravity oil, 10 per cent cut, from a total depth of 6,600 ft.

An attempt to extend the Trico gas field to the west by Lebow and McNee in their 1 Hacienda in 11-24s-22e ended in failure when the Mya equivalent proved unproductive. Development work in the northwest extension of the field is continuing with Shell scheduled to complete its third producer in a month.

Richfield has stopped the drill in its deep test of the Coles Levee field for a test of showings near bottom. Test of an unknown interval above 12,317 ft. resulted in the recovery of only a small amount of oil and gas and the operator has perforated a higher interval for further testing.

Formation tests are also under way in Standard of California's Kettleman Hills Middle Dome deep prospect hole, 73-30V, after recovering drill pipe to 10,980 ft. with bottom of the hole at 12,389 ft.

Two new locations, one northwest, the other southeast of the Edison field, highlighted prospecting in the busy Mountain View-Edison area last week. Four miles southeast of the field, Fred E. Stewart of Bakersfield has staked location for Thomas 1 in 27-30s-30e. About the same distance northwest, Seaboard is preparing to deepen an old well, Garrison-Davis 1-5 in 30-29s-29e, from 4,103 ft.

Forty-three new California locations were announced last week, an appreciable increase from the previous week's total of 26. Tide Water Associated Oil Co. is undertaking an impressive drilling program in the old Kern River field with locations made so far for 8 wells.

CALIFORNIA SUCCESSFUL WILDCAT

Santa Barbara County, Extension to Elwood Field: Signal Oil & Gas Co., 208-11 State, 8-4n-29w, TD 8116 ft., plug 6325, flowed 400 bbl. per day through ¼-in. choke. Westerly extension of Sespe production.

CALIFORNIA WILDCAT FAILURES

Orange County, Garden Grove area: Standard Oil Co. 1 Stanley Community, 33-4s-10w, dry, TD 8704 ft.

Tulare County, Goshen area: The Superior Oil Co. 1 Huntley, 7-18s-24e, dry, TD 3,811 ft.

Kern County, Comanche Point area: Gene Reid Exploration Co., 3 Tejon, 25-32s-29e, dry, TD 1,822 ft.

Ant Hill area: Seaboard Oil Co. 76-36 Seaboard-Richfield, 36-29s-29e, dry, TD 5,306 ft.

Kings County, Trico area: Lebow and McNee 1 Hacienda, 11-24s-22e, dry, TD 4,460 ft.

OHIO, KENTUCKY

Mifflin Pool Gets ½-Mile Extension

COLUMBUS.—Roy Stewart again extended the Mifflin pool, this time ½ mile to the west. His 1 George W. Scott, Section 23, Mifflin Township, Ashland County, came in at 2,960,000 cu. ft. natural from the Clinton sand which was reported at 2,421-39 ft.

The Ohio Fuel completed one of the best wells yet found along the west side of the Symmes pool in Lawrence County. The well, 3 Irish & Riley, Section 19, Symmes Township, gaged 2,390,000 cu. ft. natural and the Clinton was logged at 3,157-87 ft.

The first gas well found in the Oriskany sand oil pool in Perry Township, Muskingum County, was drilled in by the Atha Realty Co. along the west edge of the pool on Forrest Hamilton, Section 12. The sand was topped at 3,012 ft. and drilled to 3,015 ft., where it gaged 820,000 cu. ft. natural.

The town lot drilling in the City of Canton is still going on with large open flow gas wells being completed. This week Frank et al completed their 1 Scaville-Wierbaugh, Section 34, Plain Township, Stark County, with a natural gas flow of 3,600,000 cu. ft. in the red Clinton at 4,547-87 ft. After shot, the well was shut in on the casing at 14,-500,000 cu. ft.

The Salt Creek Development 1 U.S.A.-McCoid, Section 34, Salt Creek Township, Muskingum County, found the Clinton sand dry, but a good showing of oil in the Medina at 4,422-32 ft. After shooting, the well made 65 bbl. in 24 hours.

Six of the 19 locations reported this week were in Stark County, while Muskingum County reported 4, Noble 3, and Lorain and Holmes 2 each. Brush Creek led in completions with 6 out of 25.

OHIO WILDCAT FAILURES

Lake County, Concord Township: Benedum-Trees 1 D. Farinacci, Lot 12, Newburg 2,995-3,016 ft., TD 3,221 ft.

Muskingum County, Falls Township: Zanesville Tool & Supply 1 Smith Est. 3Q, Clinton 3,331-79 ft., TD 3,446 ft.

EASTERN KENTUCKY

ASHLAND.—Kentucky-West Virginia Gas Co. 835 on the E. L. Pinson property in Pike County, came in for an initial flow of 1,850,000 cu ft. of gas from the shale at 3,308 ft.

Same company's 5,705 on the Samuel Arnett property in Magoffin County flowed 856,000 cu. ft. from total depth of 1,142 ft.

A completion on the Gholson Howard property, Magoffin County, Kentucky-West Virginia Gas No. 5,674, total depth 2,548 ft., was dry.

WESTERN KENTUCKY

OWENSBORO.—J. C. Ellis et al are apparently completing another good producer in the new Griffith pool of Daviess County at their 7 Shipp Heirs, 8-P-28. This well is reportedly flowing approximately 10 bbl. of oil per hour during cleaning out operations following a 70-qt. shot in the Palestine at 1,004-16 ft. Total depth is 1,024 ft. The 6 Shipp Heirs, in the same section, is awaiting completion in the Palestine at 1,001-07 ft., total depth. It is showing for a gas producer with an estimated production of 4,000,000 cu. ft. daily.

WESTERN KENTUCKY WILDCAT FAILURE

Henderson County: Carter Oil Co. 1 S. E. Galloway, 8-O-23, elev. 398 ft., dry at 2,702 ft., Menard 1,722 ft., Barlow 2,180 ft., Ste. Genevieve 2,467 ft.

INDIANA

EVANSVILLE.—Henry Smith et al 1 E. Hunt, SE SE NE 7-2s-10w, Gibson County, showed prospects of opening the first Benoist production in the new pool near the Princeton townsite last week when a 1-hour drill-stem test of that formation at 1,929-45 ft. resulted in the recovery of 30 ft. of clean oil and 60 ft. of oil-cut mud. Saturation was encountered in the Benoist at 1,902-07 ft. and at 1,928-44 ft., total depth, and pipe has been set. Other production in the area is from the Cypresss and.

Indiana completions remained at a relatively low level during the past week with only seven wells finaled. Five of the wells were oil producers and two dry, none of which were wildcats. Nine new tests were started during the week, four each in Gibson and Posey counties and one in Knox.

MISSISSIPPI

Sour Gas Discovery For Jefferson County

JACKSON.—A new sour gas field was reported last week in Jefferson County. California Co.'s wildcat, the 2 W. G. Greer, 10-9n-4e, opened the McBride field with a flow of 407,000 cu. ft. of gas a day.

In Issaquena County, Warren Petroleum Co.'s 1 Jane S. Heath, 2 miles northeast of Fitler, 9-10n-8w, was shut down for rig repairs at 3,861 ft. Cores at 3,455-63 ft. recovered white limestone, and at 3,463-70 ft., 3,486-94 ft., gas rock was picked up. Hard gray limestone, with a sour gas odor, was cored at 3,494-3,562 ft. Other exploration included Carter Oil Co.'s 1 Carl Day, 9-12n-3w, Yazoo County, which was coring below 6,859 ft. in ashy, soft white sand. Warren Petroleum and Tide Water Associated Oil Co. 1 LeRoy Percy State Park, 5 miles west of Hollandale, 8-15n-7w, Washington County, was shut down by high water at 2,490 ft. In Chickasaw County, Pan American Production Co. 1 H. B. Carter, 24-12s-4e, 3 miles southwest of Okolona, was drilling below 1,894 ft. in hard sand.

MISSISSIPPI SUCCESSFUL WILDCAT

Jefferson County: The California Co. 2 W. G. Greer, NW SW NE 10-9n-4e, flowed 407,000 cu. ft. sour gas, 13/64-in. choke, Sparta 1,745 ft., cap rock 1,865 ft., tubing pressure 162 lb., shut-in pressure 537 lb.

MISSISSIPPI WILDCAT FAILURE

Holmes County: Skelly Oil Co. 1 Spawn, SW SE 22-14n-1w, dry, TD 6,993 ft., shaly sand 4,901 ft., sandy shale 5,653 ft., conglomerate 6,206-11 ft.

TENNESSEE

MICHIE.—Stephens Petroleum Co. 1 Petree, a wildcat 1,000 ft. northeast of Michie, on Highway 22, and 4 miles from the Mississippi state line, was said to be at 4,040 ft. Reports are that a gas sand at 4,010-40 ft., thought to be in the Cambrian dolomite, had threatened to blow out. Operator

will run casing when a lost bit is recovered. Electric log tops, on a derrick floor elevation of 585 ft., are: Silurian 471 ft., Ardouian 555 ft., Well Creek dolomite 1,205 ft. Fresh water was found at 3,200 ft.

ILLINOIS

Gallatin County Wildcat Has Shown in Hardinsburg

MATTOON.—Ashland Oil & Refining Co. et al are waiting on cement with casing set to test the Hardinsburg sand at their 1 F. Foster, NW SE NW 11-8s-9e. From an elevation of 270 ft. this well encountered saturation in the Hardinsburg at 2,328-60 ft., total depth, and showed promise of opening a new area when a drill-stem test at 2,330-50 ft. recovered 2,000 ft. of gas and 145 ft. of mud-cut oil. It is located about ¾ mile southeast of the Inman pool in Gallatin County.

In Marion County, the National Associated Petroleum Corp. has set casing to test the Aux Vases sand at the 1 George Boye et al, NW NE NW 21-4n-4e. A 1-hour drill-stem test of this sand at 2,206-10 ft. resulted in the recovery of 10 ft. of clean oil and 190 ft. of oil-cut mud. Total depth is 2,210 ft.

Continued development is apparently proving up a good oil pool about 2½ miles east of the village of Browns. The discovery well of this area, Fleming & Swan 1 Berberich, SE SE NW 26-1s-14w, Wabash County, was completed approximately 2 weeks ago and is now producing at the rate of 275 bbl. of oil daily. Producing horizon is the McClosky limestone at a depth of approximately 2,950 ft. Four other wells are now drilling in the pool and locations have been staked for two more.

Illinois completions showed a decided drop during the past week as operators finaled only 27 wells, 18 of these being oil producers and the remainder dry. Four of the dry holes were wildcats. New operations announced during the week totaled 32, and only 4 of these were exploratory wells, 1 each in Douglas, Clay, Jasper, and White counties.

ILLINOIS WILDCAT FAILURES

Clark County: J. H. Lester et al 1 Athey, SE SE NE 29-10n-14w, dry at 1,407 ft., Glen Dean 882 ft., Cypress 967 ft., Benoist sand 1,105 ft., Aux Vases sand 1,152 ft., Ste. Genevieve 1,174 ft.

Gallatin County: Earl Witt et al 1 C. Hill, SE SE SE 28-7s-9e, dry at 3,120 ft., Tar Springs 2,355 ft., Glen Dean 2,422 ft., Cypress sand 2,650 ft., Benoist sand 2,777 ft., Aux Vases 2,923 ft., Ste. Genevieve 2,948 ft., McClosky 3,022 ft.

Jefferson County: C. E. Brehm 1 G. Sloat, NW NW SW 31-1s-2e, dry at 2,383 ft.

Lawrence County: Joe Bauer et al 1 Doll Heirs, SW NW NW 35-3n-11w, dry at 1,950 ft., Glen Dean 1,438 ft., Ste. Genevive 1,840 ft., St. Louis 1,930 ft.

PERMIAN BASIN

New Pool Assured For Hale County

MIDLAND.—A second producing area for Hale County was assured last week when Stanolind Oil & Gas Co. 1 E. L. Fisher, 6 miles northwest of the town of Petersburg, and 22 miles northeast of the new Irish field, swabbed at the rate of 8 bbl. of high-gravity oil an hour from the Wolfcamp at 6,895-6,992 ft., total depth. Early in the week it swabbed a total of 118 bbl. of oil, and no water, in 16 hours. It was shut in for approximately 4 hours and then 15 hours of swabbing put 96 bbl. of oil in the tanks. The latter test cut 3/10 of 1 per cent sediment and water. Fluid level was said to have remained around 3,500 ft. from top while swabbing. Operators plan to treat with acid after making further swabbing tests.

In Ector County, American Republics Corp. 1 TXL, ½ mile south of the new Ellenburger extension area to the TXL field, made 121 bbl. of 39.8° oil on completion tests, from casing perforations at 7,798-7,815 ft. Pay zone is believed to be the Wolfcamp, basal Permian. Both the Devonian and the Ellenburger zones were barren. On an elevation of 3,353 ft., base of the Permian was reported at 7,810 ft., top of the Woodford at 8,190 ft., and top of the Devonian at 8,377 ft. The Ellenburger, which contained sulfur water, was found at 10,716 ft., and after a drill-stem test at 10,712-736 ft., hole was plugged back to 8,000 ft.

Five miles southeast of Shafter Lake, Andrews County, Union Oil Co. 1-F A. C. Means, was to be abandoned after a shot in the San Andres at 4,610-90 ft. failed to develop production.

In southeastern Reeves County, Argo Oil Corp. 1 Mrs. Dora Roberts, 13 miles northeast of Balmorhea, was shut in to check pressures after cleaning out to plugged-back depth of 10,875 ft., after acid treatment. This well was said to have swabbed some 50 bbl. of oil in 24 hours from the Wolfcamp, basal Permian, late in December. If productive, it will open production from a record depth in the Delaware Basin.

Plymouth Oil Co. 1-1 R. B. Cowden, northeast offset to Humble Oil & Refining

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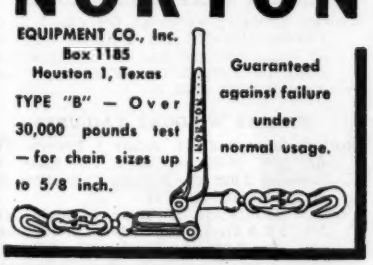

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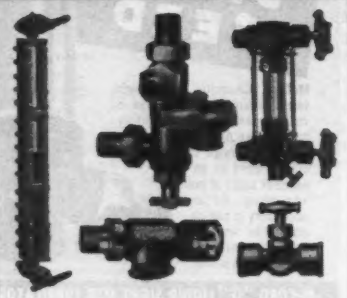

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Co. 1-B R. B. Cowden, opener of the Andector field, Andrews County, took a 25-minute drill-stem test in the Ellenburger at 8,660-8,712 ft. and recovered only 50 ft. of drilling mud. An unestimated amount of gas reached the surface in 18 minutes. Operators were drilling ahead below 8,723 ft.

WEST TEXAS WILDCAT FAILURES

Pecos County: The Texas Co. L. E. Parke, Sec. 6, Blk. 146, T&STL Sur., 1½ mi. W Ft. Stockton field, dry, TD 3,170 ft., Rustler dolomite 1,610 ft., Yates 2,918 ft., elev. 2,876 ft.

Presido County: Argo Oil Corp. 1 Mitchell Bros.-State, Sec. 40, Blk. 1, TWNG Sur., dry, TD 9,993 ft., Cretaceous 2,250 ft., limestone 2,330 ft., Permian 3,600 ft., Wolfcamp 4,880 ft.

Runnels County: Johnson & Jones 1 Ashton, Sec. 36, D. Diaz Sur. 532, 7 mi. NE Ballinger, dry, TD 3,664 ft., Adams Branch 3,346 ft., Strawn 3,630 ft.

PANHANDLE

AMARILLO.—A proposed Ellenburger test by Phillips Petroleum Co. on the northeast flank of the Panhandle uplift, in Roberts County, was announced this week. The test will be 1 W. R. Campbell, Section 38, Block 2, I&GN Survey, approximately 14 miles southwest of Miami and just north of the Gray County line. Total depth to the Ellenburger has been estimated at 8,000 to 9,000 ft. Other major companies holding acreage in that area include Stanolind Oil & Gas Co., The Pure Oil Co., and Gulf Oil Corp.

SOUTHEASTERN NEW MEXICO

HOBBS.—The Texas Co. Lea County wildcat, the 1 W. C. Garrett, 8 miles northeast of the Lovington field, 22-16s-38e, was reported to have found a show of oil in a 9-ft. core recovered from 5,310-19 ft. Operators were preparing for a drill-stem test at that level. Total depth is 5,319 ft.

Many extension tests were under way last week. On the north side of the Drinkard field, east central Lea County, Mid-Continent Petroleum Corp.'s projected 6,800-ft. test was ready to drill ahead. Located in the SW SW 16-21s-37e, it would extend production limits 1½ miles.

KANSAS

Tests Disappointing at Barber County Wildcats

WILDCATS on two sides of Medicine Lodge, in Barber County, proved somewhat disappointing during testing stages late last week. The Globe and Huber 1 Smith, NE NE 10-32-12w, 1 mile west of the town, drilled plug on the Mississippi and shot with 60 qt. at 4,235-63 ft. Result was a fill up of only 900 ft. of fluid in 18 hours with 15 per cent of the fluid being water. The well was then deepened to 4,270 ft. where it swabbed oil at the rate of 5½ bbl. in 10 hours. Water content during the swab test was estimated at 3 per cent.

Two miles east of Medicine Lodge, plug was drilled to 4,345 ft. at the H. W. Skinner 1 Skinner, NE SW NE 5-32-11w, and the well showed only 2 bbl. of fluid per hour, of which 90 per cent was water. Saturation was encountered in the Mississippi at 4,337-50 ft. in this well, and a drill-stem test prior to setting casing resulted in the recovery of 65 ft. of oil and gas-cut mud and a trace of free oil during a 15-minute period.

The north offset to the new South Boggs pool discovery well in Barber County, Cities Service Oil Co. 1-B Boggs, SW SW SW 16-33-12w, flowed oil at the rate of 42 bbl. per hour for 3 hours on initial test during the past week and has been shut down to move out rotary. Operators set 5-in. casing at 4,830 ft. on the top of the Simpson sand, and after plug was drilled, mud was circulated out with fresh water and the hole swabbed down to 2,200 ft. when the well kicked off. About ¼ mile west of the discovery, Continental Oil Co. is starting the 1 Smith "A," NW NE NE 20-33-12w.

KANSAS SUCCESSFUL WILDCAT

Cowley County: Kewanee Oil Co. 1 J. C. Combs, NE NE SE 5-30s-5e, pumped 50 bbl. of oil per day from Bartlesville sand at 2,833-53 ft.; Mississippi lime 2,860 ft., TD 2,863 ft.

KANSAS WILDCAT FAILURES

Butler County: E. H. Adair 1 Brown, SW SE SW 12-25s-4e, dry, TD 2,800 ft., Lansing 1,925 ft., Kansas City 2,245 ft., conglomerate 2,692 ft.

Cowley County: H. H. Blair 1 Moyle, NW NW SE 5-31s-4e, dry, TD 3,329 ft., Kansas City 2,306 ft., Bartlesville 2,836 ft., Mississippi lime 2,928 ft., Kinderhook 3,204 ft., Arbuckle 3,288 ft.

Ellis County: Royer & Farris and Continental 1 Albert, NW SW NW 5-13s-18w, dry, TD 3,900 ft., anhydrite 1,490 ft., Heebner 3,280 ft., Lansing-Kansas City 3,519 ft., conglomerate 3,803 ft., Arbuckle 3,855 ft.

Graham County: Western Drilling 1 Johnson, SE SE SE 11-10s-22w, dry, TD 4,019 ft., anhydrite 1,785 ft., Lansing-Kansas City 3,551 ft., Basal Kansas City 3,785 ft., Marmaton 3,863 ft., conglomerate 3,908 ft., Simpson 3,961 ft., Arbuckle 3,978 ft.

Hamilton County: Stanolind Oil & Gas 1 Lahmeyer Unit, SW SW NE 23-26s-40w, dry, TD 2,692 ft., Herrington 2,498 ft., Krider 2,510 ft., Winfield 2,553 ft., Ft. Riley 2,661 ft.

Marion County: Veeder Drilling 1 Rosenberg, SW NW SW 15-20s-3e, dry, TD 2,952 ft., Mississippi lime 2,432 ft., Lansing-Kansas City 1,877 ft., Viola 2,768 ft., Simpson 2,818 ft., Arbuckle 2,902 ft.

D. Wilson 1 Holub, NW SW SE 5-19s-4e,

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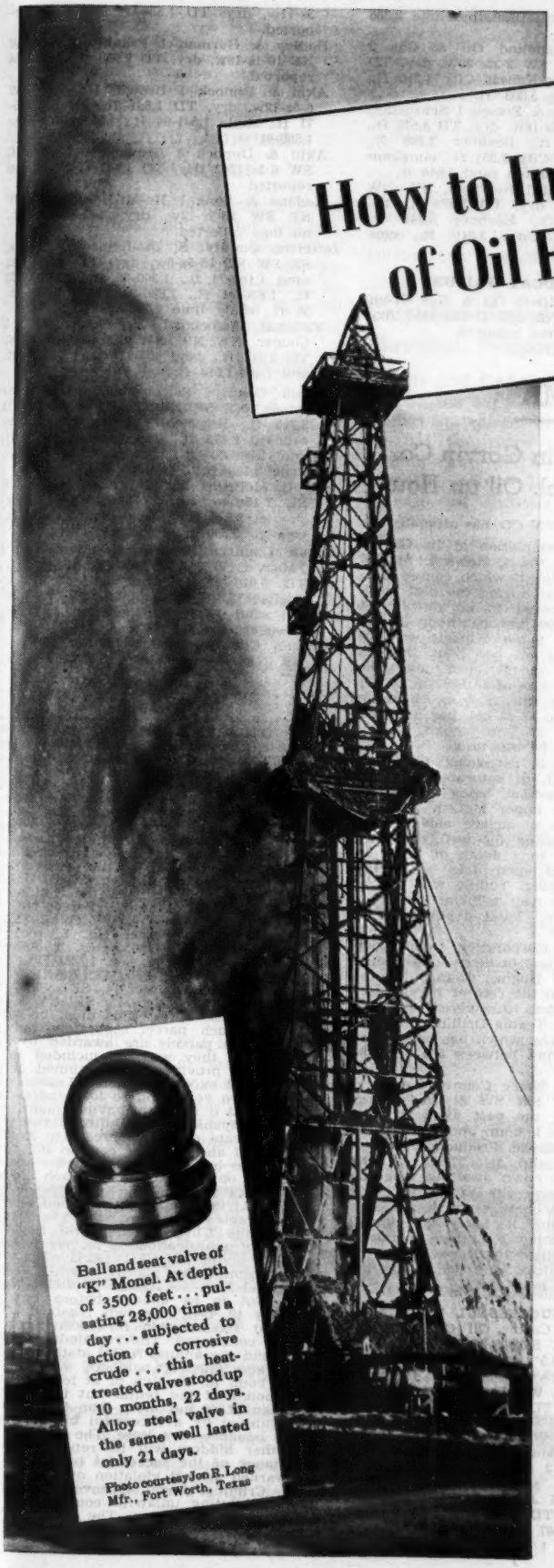

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dry, TD 2,432 ft., Mississippi lime 2,385 ft.

Meade County: Stanolind Oil & Gas 2 Adams, NE NE SW 9-35s-30w, dry, TD 6,000 ft., Lansing-Kansas City 4,210 ft., Mississippi lime 5,808 ft.

Rush County: Cross & Eresch 1 Schroeder, SW SW NE 1-19s-16w, dry, TD 3,678 ft., anhydrite 965 ft., Heebner 3,280 ft., Lansing-Kansas City 3,351 ft., conglomerate 3,597 ft., Layton sand 3,666 ft.

Iron Drilling et al 1 Herrman, NW NW NW 13-16s-18w, dry, TD 3,579 ft., anhydrite 1,125 ft., Heebner 3,241 ft., Lansing-Kansas City, 3,310 ft., conglomerate 3,535 ft.

IOWA WILDCAT FAILURE

Dallas County: Redfield Oil & Gas Group 1 Macklin, C NE NE 17-78n-28w, dry, no tops or depths reported.

OKLAHOMA

Sohio Strike in Garvin Co. Flows 100 Bbl. Oil an Hour

SOHIO PETROLEUM CO. has officially announced the completion of its Garvin County discovery, the 1 Howard, SE SE NW 17-1n-2w, a wildcat which caused considerable excitement during the past week when it was rumored to be flowing at rates as high as 2,000 bbl. per hour. Actual flow according to Sohio officials was 100 bbl. of 39°-gravity oil per hour through 2½-in. tubing set in the open hole. The well flowed at the rate of 55 bbl. of oil per hour for 36 hours with a ½-in. choke in place and at a rate of 33 bbl. per hour for 36 hours through a ⅞-in. choke. Gas-oil ratio was said to be 800 to 1.

The 1 Howard is producing from approximately 140 ft. of saturated Bromide sand, the sand section being topped at 10,060 ft. and the upper McLish dolomite at 10,202 ft. from a surface elevation of 1,067 ft. In completing the well, operators ran 5½-in. casing to a depth of 10,064 ft. leaving 170 ft. of open hole below the bottom of the casing. Tubing was run to 10,064 ft. and the well is being produced through open hole. Total depth is 10,234 ft. in the McLish.

The Oklahoma Corporation Commission has ordered operators in the new Wetumka Southeast pool of Hughes County to produce their wells at the rate of 150 bbl. per day. The pool was discovered about 3 weeks ago by the Texola Drilling Co. et al 1 Meadors, 31-9n-11e, which has been flowing at rates varying between 500 and 800 bbl. per day.

G. C. Harwell's Noble County discovery, the 1 Greer, SW SW SW 24-23n-1w, was completed during the past week to flow 60 bbl. of oil in 1 hour and 25 minutes through a ½-in. choke. Production is from the Bartlesville sand at 4,374-95 ft. The well is now shut down awaiting pipe-line connection. It is expected that Harwell will start at least four new wells in the area immediately while at least that many more are anticipated by other operators. The next test drilled by Harwell may be carried to the Wilcox sand which was the objective of the first test.

OKLAHOMA SUCCESSFUL WILDCAT

Garvin County: Carter Oil Co.-Vierson 1 Hart, SE SE SE 23-3n-3w, flowed 20 bbl. of oil, 59.5° gravity, through ½-in. tubing choke from 7,206-28 ft.; sand 7,197-7,202 ft., Woodford 7,400 ft., Hunton 7,635 ft., TD 7,721 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Anderson-Prichard 1 Atch-E-Su-Ah, W/2 SW SW 35-3s-11w, dry, TD 1,507 ft., sand 1,485-1,504 ft.

Art Wagoner 1 Jensen, NE SE NW 34-2s-11w, dry, TD 1,884 ft., sand 1,840-41 ft. and 1,865-67 ft.

C. B. Christie 1 Stegall, SE SE NE 33-3s-11w, dry, TD 1,554 ft., no tops reported.

Hadley & Harman 1 Franklin, SW SW NE 10-1s-10w, dry, TD 2,950 ft., no tops reported.

Akin & Dimock 1 Brown, NE SW SW 6-5s-12w, dry, TD 1,591 ft., sand 1,570-71 ft., shale 1,581-84 ft., Megargle lime 1,590-91 ft.

Akin & Dimock 2 Brown, NE SW NE SW 6-5s-12w, dry, TD 1,647 ft., no tops reported.

Kadane & Sons 1 He-Mi-Noke-Ky, NW NE SW 23-2s-12w, dry, TD 2,013 ft., no tops reported.

Jefferson County: S. D. Johnson 1 Rolls, SE SW SE 15-5s-8w, dry, TD 2,600 ft., sand 1,165-74 ft., 1,300-05 ft., 1,388-1,423 ft., 1,640-74 ft., 1,686-97 ft. and 1,725-36 ft., shaly lime 1,755-75 ft.

National Associated Petroleum Co. 1 Cooper, NW NW NW SE 4-4s-9w, dry, TD 2,517 ft., sand 655-71 ft., 1,368-78 ft. and 1,484-1,514 ft.

Lincoln County: Falcon-Seaboard 1 Patterson, NE SE NW 20-13n-5e, dry, TD 3,745 ft., Hogshooter 2,494 ft., Checkerboard 2,875 ft., Cleveland 2,919-27 ft. and 2,946-60 ft., Oswego 3,681-96 ft., Prue 3,703 ft., Prue sand 3,715 ft.

W. C. McBride, Inc. 2 Lochner, NW NE SE 7-15n-4e, dry, TD 3,935 ft., Hogshooter 2,876 ft., Checkerboard 3,186 ft., Oswego 3,840 ft., Prue 3,912 ft.

Logan County: Peppers Refining Co. 1 Fabor, C W/2 NW NW 18-18n-3w, dry, TD 5,010 ft., Hoover 2,933 ft., Carmichael 3,345 ft., Avant 4,095 ft., Layton sand 4,678 ft., Cleveland 4,864 ft., Checkerboard 4,955 ft.

McClain County: Carter Oil Co. 1 Price, NE NE 13-7n-4w, dry, TD 10,885 ft.,

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 p.m., February 19, 1947, for land described herein situated within the known geologic structure of the Osage oil field, 6th P.M., Wyoming. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act of February 25, 1920 (40 Stat. 437, 30 U.S.C. sec. 181), as amended, in the following parcels: T. 46 N., R 63 W., Percel No. 1, sec. 4, SW¼SW¼; sec. 9, W½NW¼, SE¼NW¼, 160 acres. Parcel No. 2, sec. 9, N½SW¼, SE¼SW¼, 120 acres. T. 46 N., R. 64 W., Parcel No. 3, sec. 1, E½E½, 160 acres. Parcel No. 4, sec. 12, E½E½, 160 acres. Parcel No. 5, sec. 14, SE¼NE¼, 40 acres. Parcel No. 6, sec. 15, SE¼NW¼, 40 acres. Total 680 acres. Bids must be submitted on each parcel separately but if two or more parcels are awarded to the same bidder they may be included in a single lease, provided the combined acreage does not exceed 640 acres. Leases will issue for five years and so long thereafter as oil or gas is found in paying quantities. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil and 12½ per cent to 16⅔ per cent for gas in accordance with the schedule shown on the lease form. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check, made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.42. The envelopes should be plainly marked, "Bid for Parcel No. ——, Osage oil field, Wyoming. Not to be opened before 1 p.m., February 19, 1947." No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a corporate surety bond in the sum of at least double the amount of the rental but in no case less than $1,000 nor more than $5,000 must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Fred W. Johnson, Acting Director.

Woodford 9,688 ft., Hunton 9,902 ft., Viola 10,390 ft., Sylvan 10,775 ft., Bromide sand 10,870 ft.

Tillman County: J. D. Andrews 1 McCary, SW SW NE 10-2s-15w, dry, TD 2,270 ft., no tops reported.

Gasoline-Pump Demand Far Ahead of Output

Production of gasoline pumps is far behind current demand for replacements and is expected to be farther behind as construction of new service stations gets under way, according to G. Denny Moore, managing director of the Gasoline Pump Manufacturers Association.

Shortages of brass, steel, fractional motors, and special parts have held up pump manufacturers, and many were further hampered by the recent coal strike. Replacement demand for pumps is expected to continue high because of the age of most pumps now in use. The association closed its midwinter meeting last week in Chicago.

Texas Legislators Propose New Oil, Gas Tax Plan

AUSTIN.—A group of five members of the Texas legislature have proposed a radical new oil and gas taxation measure which would replace Texas' present gross-production tax on oil with a levy graduated according to the size of the producer.

The bill was scheduled for introduction in the Texas House of Representatives this week. Known as the teacher pay-support bill, it would raise the total tax paid by the oil, gas and sulfur industries by some $38,000,000 annually.

FPC Asked to Delay Action On New York Gas Pipe Line

WASHINGTON.—Big Inch Natural Gas Transmission Co. has asked the Federal Power Commission to take no action on the proposal of Trans-Continental Gas Pipe Line Co. for a Texas-New York gas line until after War Assets Administration disposes of the Big Inch system.

In a protest to the application of Trans-Continental, Big Inch Natural Gas said approval at this time might result in the elimination of competition if Trans-Continental were the high bidder for the government-owned system, or make it more difficult for WAA to get the maximum possible offer for the lines. Estimated cost of the proposed Trans-Continental line is $130,000,000.

Gasoline Supply To Be Plentiful, Wilson Says

NEW ORLEANS.—There is no need to fear the supply of gasoline in the United States will become inadequate or that the price will rise out of reason, Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. of Indiana, declared here last week.

Speaking before the members council of the Association of Commerce, Wilson pointed out that the amount of gasoline available now can be doubled by converting natural gas into gasoline. Other factors assuring a plentiful supply, he said, are the development of geophysical tools allowing the drilling of wells twice as deep as those of 1918 and methods whereby the recovery from rock and sand has been increased from 30 to 70 per cent.

Canada's October Output Shows Little Change

OTTAWA.—Crude-oil production in Canada during October averaged 20,620 bbl. daily, showing little change from the previous month's daily average of 20,805 bbl., according to a report of the dominion Bureau of Statistics.

Total October production was 639,222 bbl. against 624,954 bbl. in September. October 1945 production was 682,803 bbl.

Canada's October natural-gas output showed a gain from 118,610,000 cu. ft. daily in September to 140,785,000 cu. ft. daily in October. The output also was considerably above October 1945 daily average production of 139,890,000 cu. ft. daily. October 1946 total gas production was 4,364,346,000 cu. ft.

Motorists Tax Payments Increase in December

Highway users paid $151,207,337 into the federal treasury in automotive and excise taxes in December, nearly double the $85,752,914 paid during the same month in 1945.

Largest single item was gasoline, on which taxes totaled $40,126,638, against $28,770,170 for December 1945. Taxes on lubricating oils totaled $7,236,675, against $4,669,025 in the last month of 1945.

In another phase of the petroleum industry, the Government collected $1,513,948 in taxes on the transportation of oil by pipe line, compared to a tax figure of $1,204,877 for the same month in 1945.

Wartime Allocations of Barium Carbonate Revealed

The petroleum industry received for drilling purposes 2,015 short tons, or 9.5 per cent, of the total precipitated barium carbonate allocated by the War Production Board during the 1 year period ended June 30, 1945, according to the forty-third report of the wartime distribution of controlled chemicals. The military forces received 7,888 short tons, or 37.1 per cent of the total.

Directional Drilling Hearing Set in Texas

AUSTIN.—A special hearing on directional drilling will be held soon by the Texas Railroad Commission.

A rule to limit deviation to within 3° of vertical and prohibit crossing lease lines with a directional well has been proposed to the commission.

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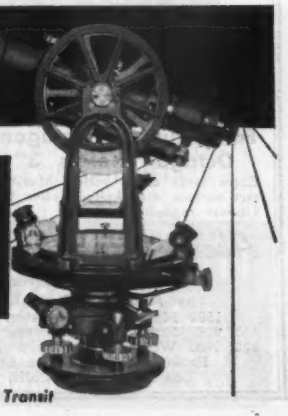

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Among the Drilling Contractors

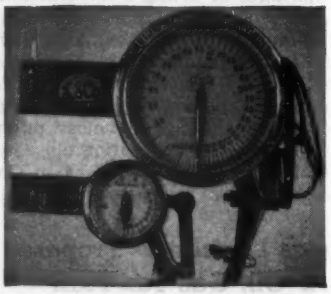
Penrod Drilling Co. has been awarded drilling contract by Sun Oil Co. to drill a 5,000-ft. test at the 1 Barlow, in Land Lot 373, District 12, Clinch County, Georgia. This is the only active operation in the state.

Summit Drilling Co. is drilling a wildcat on a 1,000-acre concentration of leases southeast of Paden, in Okfuskee County, Oklahoma. It is the 1 Gafford Estate, in SE SE NE 26-12n-7e. The venture is about 4 miles east of production.

Moutray & Moore are drilling contractors on the Texas Co. 1 Hamilton, in the J. W. Page Survey A-123, 3 miles southeast of Merkel, in Taylor County, Texas. Contract is for a 3,000-ft. test.

Gutowsky Brothers Drilling Co. has the contract to drill the Ace Gutowsky 1 Edwards, in C E½ NE SE 19-20n-4w, Garfield County, Oklahoma. Derrick was being completed and tools moved in for the well, which is to be a test of the Layton sand, expected at 4,700 to 4,800 ft. Location is on a block of 2,000 acres.

LINE SCALES



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Below: Drilling crew of Two States Drilling Co., drilling for Cities Service Oil Co. on the 9 Thomas, in the TXL field of Ector County, Texas. The men are L. D. Moody, derrick man; E. M. Commack, floor man; H. D. Ferguson, floor man; V. R. Wigley, driller, and W. D. Robinson, motor man

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Don T. Montgomery, formerly chief geologist for MacMillan Petroleum Co., has resigned to become a drilling contractor and consultant at El Dorado, Ark.

Texola Drilling Co. and E. K. Carey have started operations on west and south offsets to the discovery well in Hughes County, Oklahoma, the 1 Meadors, in NE NE NW 31-9n-11e.

H. M. Williams, Wichita, has staked the 1 Ida B. Baker, in SE SE NW 17-29n-11w, north of the town of Burlington, Okla., and southeast of Kiowa, Kans., in northern Alfalfa County, Oklahoma. First objective will be the Mississippi lime, but the well may be carried deeper.

The Tri-State Association of Oil Well Drilling Contractors is the name of a new association that was formed January 22 at a meeting of drilling contractors in the Illinois basin. Approximately 100 contractors were present at the meeting, which was held in Mount Carmel, Ill. Bob Olds, of Mount Carmel, was elected chairman. Next meeting of the group is scheduled for February 5.

Bennett & Roberts are drilling contractors on the W. L. Hartman 1 Rempke, wildcat test in NW NW SW 22-9-18, Rooks County, Kansas. The test, which is 2 miles northwest of Plainsville and ½ mile west of a dry hole drilled last June, was making hole below 2,800 ft.

W. Spencer Cook has been awarded drilling contract on the Charles W. Cook 1 August Brenner, in SE SW SE 10-3n-13w, Allegan County, Michigan.

Northern Development Co., of Lloydminster, has finished Hilldron 1, LSD 13, 35-48-28w3, in the Saskatchewan end of the Lloydminster field, Alberta. The test, drilled to 1,892 ft. in 5 days, is commercial.

Shaw Petroleums, Ltd., drilling contractors of Lloydminster, have finished at 1,876 ft. Withers-Groat 6, LSD 6, 11-49-28w3, in the Saskatchewan section of the Lloydminster field, as a commercial producer.

Ed Shields will drill the Chartiers Oil Co. 4 James Fitzpatrick, in C SE SE NW 12-15n-4w, Isabella County, Michigan.

Russell B. Patterson and **Arthur Kingery,** drilling contractors of Wewoka, Okla., have been granted a 4-month oil and gas lease to 160 acres of the municipal airport at Seminole, Okla., through action of the city council. Lease was granted under provision that the contractors do not drill more than two wells and that they drill the first within 4 months.

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PERSONALS

Brown Directing Gas Exploration Work In California

DIRECTION of increased exploration operations by Natural Gas Corp., a wholly owned producing subsidiary of Pacific Public Service Co., San Francisco, has been assigned to Marshall Brown who has had broad experience in geological and production operations in the Mid-Continent and South America. Brown's career in the petroleum industry was interrupted by 4 years during which he served as a lieutenant commander in the North Pacific as officer in charge of the Naval Fueling Station, Great Sitkin Island, in the western Aleutians.

Before entering military service, Brown was general superintendent for Leader Oil Co., Tulsa, which was purchased by Carter Oil Co. shortly after Pearl Harbor.

His experience in the industry started in 1924 when he was employed as a geologist by Gulf Oil Corp., in the Fort Worth producing division. He remained with the Gulf organization for 3 years and then became assistant chief geologist for Independent Oil & Gas Co. under A. I. Levorsen from 1927 to 1931. He returned to the Gulf organization in 1932 and was appointed production foreman at Lagunillas, Venezuela, remaining in that capacity until 1936 when he returned to the United States and became assistant superintendent for Gulf at Hobbs, N. M.

Natural Gas Corp. is currently engaged in a campaign to acquire and develop gas-producing properties in California which will improve the supply position of the parent company, one of the largest natural-gas pipe-line and distributing companies on the Pacific Coast.

R. M. Hess, formerly division production engineer for Shell Oil Co., Inc. in East Texas, is now division exploitation engineer. He succeeds **J. F. Redmond,** transferred from Kilgore to Houston and promoted to area exploitation engineer.

J. Edmund Kern has been named assistant manager of the Pacific Coast Gas Association.

Ronald Rodman, Bay Petroleum Co.; **A. M. Ballard,** Manning Oil Co.; **R. J. Gengler,** The Texas Co.; **Charles S. Hill,** independent producer; **L. L. Aitken,** Continental Oil Co.; **J. F. Cullen,** Stanolind Oil & Gas Co.; and **J. L. Dugan,** Equity Oil Co., have been appointed by the Colorado Gas Conservation Commission to study production and conservation problems in Rangely field with a view to making recommendations.

Boyd C. McRee has been promoted from petroleum engineer to district petroleum engineer for United Gas Corp., and transferred from the Shreveport to the Beeville, La., district.

Fred H. Ramseur who recently returned from military service has been named supervisor of Louisiana plants for Arkansas Fuel Oil Co. He has moved to Rodessa where he succeeds **William F. Floyd** who is now assistant manager of terminals in the company's marketing department at Shreveport.

Edward H. Hutchinson has joined Sunray Oil Corp. as a geologist in the company's Tulsa office. He formerly was senior field geologist with Bridgeport Oil Co. in Wichita, Kans., and earlier was associated there with Phillips Petroleum Co.

L. G. Cameron has resigned as district geologist, Mid-States Oil Corp., Shreveport, to enter business as an independent operator on a retainer basis with Lyons & Prentiss, Shreveport, Nemours Corp., Wilmington, Del., and Wilcox Investment Corp., Portland, Ore. He will supervise operations in the Mid-Continent and Gulf Coast areas from Shreveport.

Charles E. Dimit, petroleum engineer with Tide Water Associated Oil Co. for the past 4 years, has resigned to join Creslenn Oil Co. of Dallas.

Peter P. Gregory, Fort Worth, Tex., consulting petroleum engineer, has been commissioned to make an examination of an oil concession in the Upper Magdalena Valley of Colombia. He will be gone 4 or 5 weeks.

E. B. Tilley has been named superintendent of transportation for Gulf Oil Corp. and Gulf Refining Co., succeeding **R. H. Stark,** who has retired after 40 years with Gulf. Tilley joined Mexico Gulf Oil Co. at Tampico in 1920, remaining there until his transfer to Houston in 1929.

Dan L. Marshall, The Texas Co., has been elected chairman of the recently organized Delta section of the American Institute of Mining and Metallurgical Engineers in New Orleans. The section includes Mississippi and Louisiana. Other new officers are: **B. C. Craft,** dean of petroleum engineering at Louisiana State University, and **J. C. Posgate,** Humble Oil & Refining Co., vice chairman; **W. J. Gillingham,** division manager, Schlumberger Well Surveying Corp., secretary-treasurer; and **Earl Kipp,** California Co., and **J. W. Foley,** The Texas Co., directors.

Francis J. Powers, acting assistant general manager of the Everett refinery of Beacon Oil Co., has been transferred to the Bayway refinery of Standard Oil Co. of New Jersey in a move under Jersey Standard's executive-development training program. Other changes, all involving Everett, Mass., refinery personnel, include: **Eugene R. Swanson,** safety engineer, to Bayonne refinery in safety department; **Nils B. Bengston,** assistant mechanical superintendent, to chief engineer at Everett; **Arthur A. Corcoran,** chief engineer, to assistant mechanical superintendent; **M. Estes Cocke, Jr.,** head of the outlook department, to technical adviser to the general manager and the general superintendent; **Richard R. Keppler,** head of the operations-analysis department, to head of the outlook department; **Harold E. Everitt,** from special assignment to safety engineer; and **William T. Ricks,** contact man in the operations-analysis department, to head of the department.

Harry N. Stamper has been promoted from assistant chief civil engineer in the Houston production department of Humble Oil & Refining Co. to construction engineer.

H. A. Mason, former superintendent of laboratories at the Torrance refinery of General Petroleum Corp., has been appointed assistant to the manager of laboratories with headquarters in Los Angeles.

John R. Crain has resigned as division geologist at Tulsa for Ashland Oil & Refining Co. to open a consulting geologist practice.

Joe Meehan, vice president of Pure Transportation Co., has been named chairman of a committee to plan the 1947 meeting of the Illinois Oil and Gas Association, tentatively scheduled for early March.

W. E. Winn has resigned as superintendent of the gas department of Sun Oil Co., Dallas division, to join Aetna Oil Co., Louisville, Ky. He will be in charge of crude-oil operations, supervising production and purchases at Evansville, Ind.

G. B. Bennett, formerly manager of the gas division, Sun Oil Co., Beaumont, Tex., has been transferred to the Dallas division where he was promoted to the position of assistant manager of the gas department in that division.

Frank H. Miller, chief engineer, Big West Drilling Co., in the Shreveport district, has been transferred to Albany, Tex., where he will hold the same position in the Central West Texas district.

Roger Harrold, Ohio Oil Co., Hobbs, N. M., was elected president of the New Mexico Oil Scouts Association for 1947 at its recent meeting. Other association officers elected include **William Wilson,** Repollo Oil Co., Midland, Tex., vice president; and **E. H. Roberts, Jr.,** Drilling & Exploration Co., Inc., Hobbs, secretary-treasurer.

Marshall L. Masterson, petroleum engineer, Stanolind Oil & Gas Co., has been transferred from the Fort Worth, Tex., office to Andrews, Tex.

Joseph E. Bludworth, known for his work in the development of the commercial process for turning natural gas into chemicals, has resigned from Celanese Corp. of America and is opening offices as a petroleum and chemical consulting engineer in Corpus Christi.

Charles Canfield, assistant division geologist in Oklahoma City, has been appointed division geologist by Stanolind Oil & Gas Co. for the Gulf Coast district with headquarters in Houston. He succeeds **C. L. Larson,** who has been made exploration manager of the Rocky Mountain division at Casper, Wyo.

Roe A. Gray has been appointed a training coordinator for Socony-Vacuum Oil Co., Inc., in Venezuela. He recently was released from the armed services with a rank of lieutenant colonel and formerly was associated with General Petroleum Corp.

Pedro Verastegui MacKee, Peruvian geologist, will be in Tulsa during February visiting oil-company laboratories and plants of geophysical companies to study methods of oil exploration. He is in the United States on a government fellowship in geology. He previously has studied in California and New Mexico.

Guy Mitchell, Lion Chemical Co., last week was installed as chairman of the Ark-La-Tex section of the American Chemical Society. Other new officers are **Dave Barrow,** Arkansas Fuel Oil Co., vice chairman; **A. W. Trusty,** Arkansas Fuel Oil Co., secretary-treasurer; and **Dr. J. B. Entrikin,** Centenary College, councilor.

John N. Gilbert II, Gulf Coast scout for Standard Oil Co. of Texas, has been promoted to scout coordinator for Texas and New Mexico, with headquarters in Houston.

M. J. Adams, transferred recently from Fort Worth to Houston, has been named assistant manager of the gas division, producing department, The Texas Co. Adams has been assistant manager, West Texas-New Mexico division, producing department, since January 1, 1939. He started with the company in 1923 as operating engineer of the old natural-gas department at Forth Worth.

Stanley Wilk, formerly economics manager of Polymer Corp., Ltd., Sarnia, Ont., has been appointed costs administrator of the company.

James E. Fox, Jr., mud engineer for Stanolind Oil & Gas Co. at Greggton, Tex., has been promoted to petroleum engineer and transferred to Stanolind's Fort Worth office, replacing **Tom M. Curtis,** who moved up to field engineer, with headquarters at Odessa, Tex. **Albert E. Fisher,** production foreman at Odessa, is now field superintendent for the North Louisiana area. **Jimmie D. Christner,** junior engineer at Hobbs, N. M., has been transferred to Brownfield, Tex., and promoted to petroleum engineer, replacing **C. A. Lutz,** petroleum engineer, who moved up to head roustabout in that area. **Johnnie L. Cox,** roustabout engineer at Wink, Tex., has been promoted to apprentice engineer at Hobbs.

B. E. VanArnsdale has been promoted to the position of manager of the land department of General Petroleum Corp.'s Rocky Mountain district.

Harry Kurchick has sold his interest in Turner Petroleum Corp. and Turner Drilling Corp., Mount Pleasant, Mich., and will engage in independent development operations in Michigan and Illinois.

Art Erickson, Phillips Petroleum Co., is the new president of the Panhandle Geological Society. Other officers are **Pat Meholin,** Sinclair Prairie Oil Co., vice president, and **Robert Gutra,** Cities Service Oil Co., secretary-treasurer.

W. M. Schulz, Mount Pleasant, Mich., district geologist, Cities Service Oil Co., has been elected 1947 chairman of the Michigan chapter of the American Petroleum Institute. Other new chapter officers are: **O. E. McAlester,** Mount Pleasant, accounting department manager, Sun Oil Co., first vice chairman and program chairman; **Lester W. LeFavour,** Mount Pleasant, district production superintendent, Gulf Refining Co., second vice chairman; **Earl G. Hartman,** Mount Pleasant, vice president, Gordon Oil Co., secretary-treasurer; and **E. M. Mulvaney,** National Supply Co., **W. J. Bryan,** Dowell, Incorporated, **Noah Andrews,** Union Drilling & Producing Co., and **C. F. Knollenberg,** Sun Oil Co., advisory board members.

Shifts

N. J. Lea, foreman, The Texas Co., Bakersfield to Taft, Calif.; **J. M. Lawrence,** superintendent, George P. Livermore, Caprock, N. M., to Morton, Tex.; **Robert H. Barnes,** foreman, General Geophysical Co., Floresville, Tex., to Charlotte, Tex.; **Barrett Booth,** engineer, Houston Oil Co., Woodsboro, Tex., to Beeville, Tex.

Kenneth G. Grandall, engineer, Phillips Petroleum Co., Corpus Christi to Beaumont, Tex.; **William P. Orr,** engineer, Celanese Corp. of America, Corpus Christi to Clarkwood, Tex.; **Phillip S. Schoeneck,** geologist, The Atlantic Refining Co., Dallas to Tyler, Tex.; **H. V. Aiguier,** superintendent, Helmerich & Payne, Inc., Arcadia, La., to Brookhaven, Miss.

Henry Snyder, foreman, Danciger Oil & Refining Co., Gretna, La. to Harvey, La.; **W. D. Brown,** foreman, Danciger Oil & Refining Co., Spokane, La., to Houston; **Henry H. Branham,** foreman, Plantation Pipe Line Co., Breman, Ga., to Laurel, Md.; **R. N. Harding,** foreman, The Texas Co., Greenville, Miss., to Hattiesburg, Miss.; **H. Swithenbank,** engineer, Sun Oil Co., Linwood, Pa., to Upland, Pa.; **Gus L. Maciula,** foreman, Cities Service Oil Co., Ponca City to Tulsa.

Equipment Men in the News

Bannerman to Middle East

Technical Oil Tool Corp.'s foreign representative, P. T. Bannerman, who recently returned from a trip covering all the oil-producing countries of South and Central America, leaves for the Middle East shortly after the first of the year.

Board Elections in Butler Manufacturing

G. A. Burns, manager of the oil-equipment division, Butler Manufacturing Co., Kansas City, Minneapolis, and Galesburg, Ill., was elected a vice president of the company at a board of directors' meeting January 7. Victor C. Norquist, consulting engineer, was also named a vice president. At a stockholders' meeting, held January 7, Walter L. Smith, chief production manager, and Arvid A. Schoning, manager of the company's Galesburg division, were elected to the board of directors. Other officers reelected to the board: E. E. Norquist, chairman; Oscar D. Nelson, president and general manager; Glen C. Speakman, vice president in charge of sales; Fred A. Rufi, secretary and treasurer; Darius Melcher, manager of the Minneapolis division, and Paul G. Koontz, counsel.

New Research Building for Johns-Manville

Construction of the second and main unit of Johns-Manville's research center near Bound Brook, N. J., has been started, it is announced by Dr. C. F. Rassweiler, vice president for research and development. The first unit, comprising a product development laboratory and a water-filtration and waste-processing building, is nearing completion and will be in use in the early part of 1947. The second unit consists of a three-story research building, 350 ft. long and 67 ft. wide, and a mechanical and service building 288 by 100 ft.

Seismic Engineering in New Location

Seismic Engineering Co. has recently purchased and moved into a new building and grounds at 6111 Maple Avenue, Dallas. Previously located at 7000 Hines Boulevard, the company required additional space for its present operations and future expansion. The new plant is on a plot 100 ft. wide by 650 ft. deep and includes two buildings having a total area of over 3,000 sq. ft.

MacNeil Joins Tube Turns

Donald A. MacNeil has joined the sales staff of the forging division of Tube Turns (Inc.), Louisville, it is announced by John G. Seiler, vice president and general sales manager. He will make his headquarters in Chicago, in the Utilities Building, 327 South LaSalle Street.

Beane Sales Manager of Bristol

H. E. Beane has been appointed general sales manager of The Bristol Co., Waterbury, Conn., according to an announcement by Howard H. Bristol, president of the company. He assumed his new duties January 2. Starting as a sales engineer, Beane has been associated with the company since 1920. From 1925 to 1935, he was district manager of various branch offices of the company. He became field sales manager in 1936, and sales manager in 1943.

Brown Adds 38 Men to Engineering Staff

Brown Instrument Co., Philadelphia, has announced the appointment of 38 new sales and service engineers to 23 of its branches throughout the country and Canada, according to W. H. Steinkamp, field sales manager for the Brown division of Minneapolis-Honeywell Regulator Co. All 38 of the newly assigned sales and service engineers have just completed an intensive course in industrial instrumentation at the Brown Instrument School.

Sanderson Manager of Ryerson Boston Plant

P. SANDERSON

Park Sanderson has been appointed manager of the Boston plant of Joseph T. Ryerson & Son, Inc., effective January 1. He succeeds Herbert C. Wills who is retiring. Sanderson was an executive with E. P. Sanderson Co., Boston, when that company was acquired by Ryerson in 1926. He continued with the Ryerson organization in the capacity of sales manager.

National Supply Revises Northwest Division

J. W. (Pete) Gillespie, who has been manager of the Wyoming-Montana district of The National Supply Co., has been appointed manager of the Northwest division, according to an announcement by A. W. McKinney, vice president and general manager of sales. Gillespie succeeds I. G. Wetherill, who is retiring after 45 years with the company. At the same time the company's division headquarters is being moved from Denver to Casper, Wyo. The Denver district office is not affected by this change, and the manager there, C. L. Bainter, will continue to supervise stores at Craig, Colo., and Rock Springs, Wyo. R. M. Fifer, who formerly supervised operations in Northern Montana, is the new district manager at Casper. Stores in his district are at Kevin and Cut Bank, Mont., and Cody and Casper, Wyo.

Clark to Represent Hammond Iron Works

Appointment of Harry E. Clark & Co., Houston, as its Southwest representative is announced by Hammond Iron Works, Warren, Pa.

Oil Base Appoints Brown and Ruse

Oil Base, Inc., Los Angeles, announces the recent appointment to its sales staff of Arthur K. Brown. He has been assigned the Rocky Mountain area with headquarters in Vernal, Utah. Ralph Ruse has been transferred from the Rocky Mountain area and placed in charge of the West Texas area with headquarters at Odessa.

Hollingshead Adds Bosschieter And Kirkeby

DR. BOSSCHIETER

R. M. Hollingshead Corp., Camden, announces that Dr. Gabriel Bosschieter and Clarence D. Kirkeby have become associated with the company's coatings division. Dr. Bosschieter has recently been assistant to the president, Reliance Varnish Co., Louisville, and special representative of Calco Chemical Division, American Cyanamid Co. Kirkeby will have the duties of consulting engineer with the company. During the war he was packaging field engineer for the U. S. Army Signal Corps.

N.G.S.M.A. Board of Directors Meeting

At the board of directors meeting of the Natural Gasoline Supply Men's Association which was held December 27, 1946, in the Mayo Hotel, Tulsa, the following were present: President Fred J. Wetzel, Ingersoll-Rand Co., presiding; L. S. Allen, National Tank Co.; Roy Bush, Nordstrom Valve Co.; V. C. Canter, Jones & Laughlin Supply Co.; C. C. Clover, Westcott & Greis, Inc.; J. A. Knebel, H. K. Porter Co., Inc.; H. M. Rosevear, Wyatt Metal & Boiler Works; Paul C. Wallack, Walco Engineering & Construction Co.; and W. F. Lowe, secretary N.G.S.M.A. Communications were received from Dallas S. Deem, American Air Filter Co., Inc.; L. D. McKay, Union Steam Pump Sales Co.; and Warner Lewis, Warner Lewis Co., regretting their inability to attend. Agenda included reports and suggestions on activities at the N.G.A.A. convention in April.

Frabimor Agents for Kieley & Mueller

Kieley & Mueller, Inc., announces the appointment of Frabimor Equipment & Controls Co., Inc., 5235 North Avenue, Chicago, as agents in the Chicago and Milwaukee areas.

Johnson New Manager of Sales

G. L. JOHNSON

Appointment of G. Lawton Johnson as assistant general manager of sales of National Tube Co. is announced by H. J. Wallace, general manager of sales of this U. S. Steel subsidiary. Johnson will handle the sale of products manufactured at Christy Park Works, McKeesport, Pa., and some of the company's other fabricated products.

Watson Appointed Chief Chemist Of Calco

Appointment of Dr. Glenn S. Watson as chief chemist is announced by G. A. LaVallee, manager of the Marietta, Ohio, works of Calco Chemical Division, American Cyanamid Co. Dr. Watson will make his home in Marietta.

Wood Director of Sales

Allen T. Greiner, president of The American Coach & Body Co., Cleveland, announces the appointment of Clarence G. Wood as director of sales.